Rs. 20/-

The Wildlife of Jammu & Kashmir

A SANCTUARY Publication

Produced for

DEPARTMENT OF WILDLIFE PROTECTION J&K GOVT.



The Wildlife of Jammu & Kashmir

by Mir Inayat Ullah, Chief Wildlife Warden, J & K Government

The state of Jammu and Kashmir has a special responsibility towards the rest of the country and, indeed, the world at large. Owing to events that took place as far back as 25 million years, the region has been endowed with a truly unique variety of life forms. These creatures had to adjust to the very special environment created when the break-away island that was to form the Indian peninsula met with the Asian mainland in the cataclysmic birth of the Himalayas. The mountains, foothills and plains house a zoogeographic diversity ranging from Oriental to Palearctic flora and fauna. And it is the conservation of this diversity that is the principal responsibility of the Jammu and Kashmir Department of Wildlife Protection.

The animals we are privileged to protect are, of course, 'stars' in their own rights! Witness the snow leopard *(Panthera uncia)*, the common leopard *(Panthera pardus)*, brown bear *(Ursus arctos)*, the Himalayan black bear *(Selenarctos thibetanus)*, the hangul *(Cervus elaphus hanglu)*, red fox *(Vulpes vulpes)*, markhor *(Capra falconeri)*, musk deer *(Moschus moschiferus)*, yellow-throated marten *(Martes flavigula)* and the shapu *(Ovis orientalis)*—to name just a random shortlist! Above the mighty peaks soar grand raptors—golden eagles *(Aquila chrysaetos hodgsoni)*, lammergeiers *(Gypaetus barbatus)*, black eagles *(Ictinaetus malayensis)*, kestrels *(Falco tinnunculus)*, hobbys *(Falco subbuteo centralasiea)*, griffon vultures *(Gyps himalayensis)* and many more. Great stands of deodar *(Cedrus deodara)* and blue pine *(Pinus wallichiana)* clothe high slopes, while oak *(Quercus dilatates)*, walnut *(Juglans regia)*, mulberry *(Morus alba)* and horsechestnut deliver their bounty of fruit and leaf fodder to the animals lower down. Alpine meadows come alive each year to the profusion of wild flowers and herbs which provide sustenance to a myriad insect forms which in turn feed birds, amphibians and reptiles. No one has fully catalogued this rich diversity, and the state continues to provide a fertile field laboratory for scores of ornithologists, entymologists, botanists and zoologists. On numerous occasions lucky fossil-hunters have been rewarded with discoveries of ammonites, starfish and even *sharks*, etched for eternity in the stones of silence—all evidence of the original submarine existence of the region.

For anyone who has visited Jammu and Kashmir, seeing is believing. But even for those who are yet to come, the Department of Wildlife Protection holds out a simple promise—the wildlife and the forests of Jammu and Kashmir are alive and well and are receiving the protection they so richly deserve. In truth, our task is not being performed out of a sense of 'duty' to our follow creatures. We realise how vital the health of our woodlands is for the well-being of our people. Soil conservation, fresh water supply, sustainable fruit and fuel yields—all are dependent on the health of our 21,000 sq. km. of forest land. The animals you see in our forests are the beneficiaries of several conservation ventures including high altitude sanctuaries and ambitious afforestation drives. Perhaps the most heartening aspect of our endeavours is the fact that we have as our major supporters the youth of our state. Through nature clubs and countless lecture tours, students have become so deeply involved with our plans to develop and protect our natural wealth that we can justifiably claim success in rearing a fresh crop of conservationists who, in a few short years, will take over from us to protect what is in any event, their own heritage. □

(A) National Parks:

(1) Dachigam National Park:

The Park is situated 21 kms. from Srinagar in the north-east, and harbours the last viable population of the threatened species—the hangul. The wildlife of the area includes about 20 species of mammals and over 150 species of birds.

Approach:	Airport	.... Srinagar	(32 kms.)
	Railhead	.... Jammu	(315 kms.)
	Road	.... Srinagar	(21 kms.)

Area: 141 sq. kms.

Altitudinal Range: 1,700 to 4,000 metres M.S.L.

Accommodation: Lower Dachigam:

Panzgam	..... 2 inspection huts	..... 3 bedrooms = 6 beds.
Laribal	..... 1 inspection hut	..... 1 bedroom = 2 beds.
Laribal	..... 2 dormitories	..... 3 bedrooms = 20 beds.

Upper Dachigam:

Sangargulu	..... 1 inspection hut	..... 2 bedrooms = 4 beds.
Gratnar	..... 1 inspection hut	..... 6 bedrooms = 12 beds.

Flora: There are over fifty species of trees, twenty of shrubs and five hundred species of herbs. The principal tree species are *Pinus griffithii, Abies pindrow, Juglans regia, Morus alba, Betula utilis, Salix spp., Populus spp., Prunus armeniaca, Corylus colurna, Quercus robur, Ulmus wallichiana, Aesculus indica,* etc. Shrubs include *Berberis spp., Desmodium tiliaefolium, Parrotiopsis jacquemontiana, Indigofera heterantha, Rosa webbiana, Rosa macrophylla, R. brunonii,* and the major herbs constitute *Taraxacum officinale, Colchicum luteum, Artemisia vulgaris, Ophioglossum spp., Tulipa spp., Dipsacus mitis, Doronicum roylei, Primula spp., Anemone spp.,* etc.

Fauna: There are twenty mammal species which include hangul, Himalayan brown bear, Himalayan black bear, langur, Himalayan marmot, leopard, etc.

Avifauna: There are over 150 species of birds. The principal species are monal, koklas, bearded vulture, griffon vulture, golden eagle, grey heron, starling, golden oriole, paradise flycatcher, western yellow-billed blue magpie, kestrel, peregrine falcon, black bulbul, etc.

Visit:	Upper Dachigam	....	Mammal/Bird viewing—May to August.
	Lower Dachigam	....	Mammal viewing—September to March.
		....	Bird viewing—March to May.
Dress:	Summer	....	Trekking shoes, raincoat and light clothing.
	Winter	....	Trekking shoes, heavy woollens and waterproof wind-cheater.
	Spring	....	Trekking shoes, raincoat and light woollens.

For reservations contact:

The Chief Wildlife Warden,
Jammu and Kashmir State,
Tourist Reception Centre,
Srinagar 190 001,
Kashmir.
Phone: 75411.

(2) Kishtwar High Altitude National Park:

The Park which encompasses a vast, cliffy and compact area has been established in a part of the Chenab catchment to afford protection to the rare, endangered and protected species found here,

like the hangul, musk deer, leopard, markhor, ibex, rhesus macaque, grey langur, etc.

Approach:	Airport	.... Jammu	(250 kms.)
	Railhead	.... Jammu	(248 kms.)
	Road	.... Constructed up to Ikhala, but bus services are operated up to Plamer only 20 kms. north of Kishtwar.	

Area: 400 sq. kms.

Altitudinal Range: 1,700 to 4,800 metres above M.S.L.

Accommodation: Check with Regional Wildlife Warden.

Flora: The area is characterised by marked variations in topography, climate and altitude, as a result of which different types of forest vegetation occur. The principal tree species are *Cedrus deodara, Pinus gerardiana, Pinus wallichiana, Quercus spp., Juglans regia, Ulmus spp.*, etc. The dominant shrubs are *Parrotiopsis jacquemontiana, Viburnum spp., Desmodium tiliaefolium* and *Rosa spp.* The major herbs include *Primula spp., Brachypodium spp., Anemone spp., Dipsacus mitis, Artemisia vulgaris,* etc.

Fauna: There are over fifteen mammal species; the principal species being hangul, musk deer, markhor, goral, Himalayan black bear, Himalayan brown bear, langur, leopard, etc.

Avifauna: Fifty species of birds exist here and the main species are the Himalayan jungle crow, griffon vulture, bearded vulture, golden eagle, monal, koklas, golden oriole, paradise flycatcher, white cheeked bulbul, Indian mynah, etc.

Visit:	Mammal viewing	.... September to March.
	Bird viewing	.... March to May.
Dress:	Spring/Summer	.... Trekking shoes, raincoat and light clothing.
	Winter	.... Trekking shoes, heavy woollens and waterproof windcheater.

For reservations contact:

The Regional Wildlife Warden,
Jammu Region,
Near Jammu Ashok Hotel,
Manda (Ramnagar) Jammu,
Jammu & Kashmir State.

---

(3) Hemis High Altitude National Park:

This Park includes the catchments of the Markha and Rumbak valleys which drain into the river Indus. It is opposite the villages of Nimmu and Phyang and is named after the holy place—Hemis Gumpa. The checklist of mammals includes over 10 species, and that of birds over 50 species.

Approach:	Airport	.... Leh	(30 kms. from Nimmu)
	Railhead	.... Jammu	(695 kms. from Nimmu)
	Road	.... Leh	(35 kms. from Nimmu)
		Srinagar	(400 kms. from Nimmu)

Area: 600 sq. kms.

Accommodation: Camping sites available.

Flora: The area is barren and rocky and covered only sparsely. The natural, woody vegetation includes *Lonicera spp., Rosa webbiana, Caragana pygmaea, Myricaria germanica, Ephedera gerardiana* (when the herbaceous ground cover is in assemblage), *Taraxacum officinale, Heracleum pinnatum, Stipa barbata, Urtica spp., Artemisia spp., Rheum spiciforme, Polygonum sibiricum,* etc.

Fauna: The Park is endowed with over ten mammal species most of which are rare and endangered. The major species are shapu, bharal, *Ovis ammon* (the great Tibetan sheep), ibex, Himalayan marmot, snow leopard, etc.

Avifauna: This area has a rich and varied bird life; the principal species being chukar, Himalayan snow cock, magpie, Himalayan whistling thrush, red-billed chough, yellow-billed chough, etc.

Visit:	Mammal viewing	.... September to May.
	Bird viewing	.... March to May and September to December.

Dress:	Summer	.... Trekking shoes, windproof coat and light clothing.
	Winter/Spring	.... Trekking shoes, windproof coat and heavy woollens.

For reservations contact:

The Divisional Forest Officer,
Wildlife Warden, Leh,
Ladakh,
Jammu & Kashmir State.

(B) Wildlife Sanctuaries :

(1) Overa Wildlife Sanctuary:

The Sanctuary is situated about 76 kms. from Srinagar in the south-east, and located near Pahalgam. The area is home to a number of rare, threatened and protected species of birds and mammals. It sustains 13 species of mammals and over 80 species of birds. It has acquired an outstanding position for its varied and magnificent species of pheasants.

Approach:	Airport	.... Srinagar	(87 kms.)
	Railhead	.... Jammu	(280 kms.)
	Road	.... Srinagar	(76 kms.)
		Anantnagh	(40 kms.)
		Pahalgam	(11 kms.)

Area: 32.27 sq. kms.

Accommodation: 1 inspection hut .... 2 bedrooms = 4 beds.

Flora: The Overa Wildlife Sanctuary is richly covered with a variety of floral complexes which comprise mainly of conifers; the principal species being *Pinus griffithii, Abies pindrow, Aesculus indica, Morus alba, Juglans regia,* etc. Major shrub associates are *Indigofera heterantha, Desmodium tiliaefolium, Viburnum cotinifolium, Sorbaria tomentosa, Isodon spp.*, etc., while the main ground layer is dominated by dicotlydonous herbs comprising of *Taraxacum officinale, Artemisia vulgaris, Doronicum roylei, Colchicum luteum, Tulipa spp., Anemone spp., Primula spp.*, etc.

Fauna: This area houses a variety of mammals most of which are faced with the serious threat of extinction. They are the hangul, musk deer, serow, rhesus macaque, langur, leopard, leopard cat, etc.

Avifauna: The area as distinct from the other wildlife reserves of the valley holds a rich assemblage of pheasants like the chukar, koklas, monal and Himalayan snow cock. Other avifauna include the jungle crow, red-billed chough, griffon vulture, bearded vulture, Himalayan whistling thrush, rufous-backed shrike, Indian mynah, etc.

Visit:	Mammal viewing	.... September to April.
	Bird viewing	.... March to August.

Dress:	Spring/Summer	.... Trekking shoes, raincoat and light clothing.
	Winter	.... Trekking shoes, raincoat, heavy woollens and wind-cheater.

For reservations contact:

The Chief Wildlife Warden,
Jammu and Kashmir State,
Tourist Reception Centre,
Srinagar 190 001,
Kashmir.
Phone: 75411.

---

(2) Ramnagar Wildlife Sanctuary:

The Sanctuary is situated in close proximity of Jammu city. It is located in the catchment zone of the Kar nalla of the Tawi river. The area is richly endowed with unique, rare and endangered life forms.

Approach:	Airport	.... Jammu	(8 kms.)
	Railhead	.... Jammu	(6 kms.)
	Road	.... Jammu	(½ km.)

Area: 31.50 sq. kms.

Altitudinal Range: 430 to 611 metres above M.S.L.

Accommodation: 1 inspection hut .... 2 bedrooms = 4 beds.

Fauna: The area sustains more than eight mammal species, the most common being nilgai, barking deer, wild boar, rhesus monkey, etc.

Avifauna: The Sanctuary supports the Indian mynah, blue rock pigeon, peafowl, red jungle fowl, jungle crow, golden oriole, white-cheeked bulbul, etc.

Visit:	Mammal viewing	.... September to March.
	Bird viewing	.... March to May.

Dress:	Spring/Summer	.... Trekking shoes, raincoat and light clothing.
	Winter	.... Trekking shoes, raincoat, light woollens and windcheater.

Reservations:
For further information contact:

The Regional Wildlife Warden, Jammu,
Near Jammu Ashok Hotel,
Manda (Ramnagar),
Jammu.

---

(3) Nandni Wildlife Sanctuary:

The Sanctuary has been named after the Nandni village located at a distance of 28 kms. from Jammu, on the Jammu/Srinagar highway. The area is well known for still housing an appreciable and precious pheasant population.

Approach:	Airport	.... Jammu	(26 kms.)
	Railhead	.... Jammu	(28 kms.)
	Road	.... Jammu	(20 kms.)
		Srinagar	(274 kms.)

Area: 33.24 sq. kms.

Accommodation: Check with Regional Wildlife Warden.

Fauna: There are about eight mammal species in the area. The main species are leopard, wild boar, barking deer, rhesus monkey, goral, grey langur, etc.

Avifauna: This area is endowed with a varied but rich population of birdlife. The common birds here are the Indian mynah, blue rock pigeon, peafowl, red jungle fowl, chir pheasant, chukar, etc.

Visit:	Mammal viewing	.... September to February.	
	Bird viewing	.... March to May.	
Dress:	Spring	.... Trekking shoes, raincoat and light clothing.	
	Winter	.... Trekking shoes, raincoat and light woollens.	

For further information contact:

The Regional Wildlife Warden,
Jammu Region,
Near Jammu Ashok Hotel,
Manda (Ramnagar),
Jammu.

---

(4) Surinsar Mansar (Patwar) Wildlife Sanctuary:

The area owes its name to the two lakes situated at two corners of it. The diverse and varied faunal wealth of the area adds to its glory, besides it being easily accessible, aesthetic and ecologically significant.

Approach:	Airport	.... Jammu	(58 kms.)
	Railhead	.... Jammu	(56 kms.)
	Road	.... Jammu	(42 kms.)

Area: 97.82 sq. kms.

Accommodation: Check with Regional Wildlife Warden.

Flora: The mixed scrub forest comprises mainly of broad-leaved species which are mixed with stands of *Pinus gerardiana*. The common broad-leaved species are *Acacia spp., Mallotus phillipensis, Dalbergia sissoo, Ficus bengalensis, Ficus religiosa, Bauhinia variegata,* etc.

Fauna: The area supports a rich population of wild mammals which number upto eight species; the main species being goral, wild boar, barking deer, leopard, etc.

Avifauna: The area is refuge to a multitude of birds including the black partridge, red jungle fowl, peafowl, grey partridge, green pigeon, blue rock pigeon, rufous turtle dove, etc.

Visit:	Mammal viewing	.... September to February.
	Bird viewing	.... March to May.
Dress:	Spring	.... Trekking shoes, raincoat and light clothing.
	Winter	.... Trekking shoes, raincoat and light woollens.

For further information contact:

The Regional Wildlife Warden,
Jammu Region,
Near Ashoka Hotel,
Manda (Ramnagar),
Jammu.

---

(5) Jasrota Wildlife Sanctuary:

This Sanctuary which is famous for harbouring a vast population of cheetal, is located on the right bank of the river Ujh, towards the north of the village Jasrota and about 70 kms. north-west of Jammu. The entire area sustains mainly bamboo plantations.

Approach:	Airport	.... Jammu	(65 kms.)
	Railhead	.... Jammu	(63 kms.)
	Road	.... Jammu	(70 kms.)

Area: 10.04 sq. kms.

Accommodation: Check with Regional Wildlife Warden.

Flora: Though dominated by bamboo plantations, the other broad-leaved associates here are *Acacia catechu, A.arabica, Dalbergia sissoo, Lannea grandis,* etc. The main shrubs are *Lantana camara, Carisa spinarum, Dodonea viscosa,* etc.

Fauna: The area still houses an appreciable number of animal life, the most prolific being cheetal, barking deer, wild boar, rhesus monkey, etc.

Avifauna: The area harbours a rich variety of pheasants apart from the other migratory and resident birds. The principal species are peafowl, red jungle fowl, jungle bush quail, green pigeon, blue rock pigeon, etc.

Visit:	Mammal viewing	.... September to February.
	Bird viewing	.... March to May.
Dress:	Spring	.... Trekking shoes, raincoat and light clothing.
	Winter	.... Trekking shoes, raincoat and light woollens.

For further information contact:

The Regional Wildlife Warden,
Jammu Region,
Near Jammu Ashok Hotel,
Manda (Ramnagar),
Jammu.

(C) Biosphere Reserves:

(1) Overa-Aru Biosphere Reserve:

The area is located at a distance of 76 kms. from Srinagar to its south-east. It is famous for retaining several rare and endangered species like the hangul, musk deer, brown bear, leopard, koklas, monal and snow cock.

Approach:	Airport	.... Srinagar	(87 kms.)
	Railhead	.... Jammu	(280 kms.)
	Road	.... Srinagar	(76 kms.)
		Anantnagh	(40 kms.)

Area: 400 sq. kms.

Altitudinal Range: 3,050 to 5,425 metres above M.S.L.

Accommodation: 1 inspection hut .... 2 bedrooms = 4 beds.
Tourist and private accommodation readily available at Pahalgam.
Camping site available.

Flora: The area holds a rich cover of vegetation, the dominant forest consisting of conifers which account for over 90%. The principal species are *Cedrus deodara, Pinus griffithii, Abies pindrow, Aesculus indica, Juglans regia, Corylus corulna,* etc. The major shrubs are *Indigofera heterantha, Viburnum spp., Parrotiopsis jacquemontiana, Sorbaria tomentosa,* etc. The ground cover is very rich and dicotyledonous herbs dominate, comprising of *Rumex patientia, Primula spp., Anemone spp., Doronicum roylei, Dipsacus mitis,* etc.

Fauna: Nature has gifted this Biosphere Reserve with multiple species of rare, endangered and protected species. The main species are hangul, musk deer, serow, brown bear, leopard, rhesus macaque, grey langur, Himalayan mouse hare, etc.

Avifauna: The area houses a good population of pheasants and upland birds apart from other species, both resident and migratory. The common birds are the griffon vulture, monal, snow cock, koklas, blue rock pigeon, Kashmir roller, European hoopoe, golden oriole, jungle crow, etc.

Visit:	Mammal viewing	.... September to March (in lower areas).
	Bird viewing	.... March to May (in lower areas).
	Mammal/Bird viewing	.... May to August (in upper areas).
Dress:	Spring/Summer	.... Trekking shoes, raincoat and light clothing.
	Winter	.... Trekking shoes, heavy woollens and waterproof wind-cheater.

For further information contact:

The Chief Wildlife Warden,
Jammu and Kashmir Government,
Tourist Reception Centre,
Srinagar 190 001,
Kashmir.
Phone: 75411.

---

(2) Gulmarg Biosphere Reserve:

Situated to the south-west of Srinagar and located at a distance of 48 kms. from there, the area has an appreciable number of Himalayan musk deer and bear and supports a rich and varied avifauna.

Approach:	Airport	.... Srinagar	(57 kms.)
	Railhead	.... Jammu	(342 kms.)
	Road	.... Srinagar	(48 kms.)

Area: 180 sq.kms.

Altitudinal Range: 2,400 to 4,300 metres.

Accommodation: Tourist and private accommodation readily available.

Flora: The area's vegetation constitutes more than 90% conifers. The principal species are *Pinus griffithii, Abies pindrow, Picea smithiana, Juglans regia, Aesculus indica,* etc. The shrubs include *Isodon spp., Indigofera heterantha, Viburnum cotinifolium,* etc. The rich ground layer includes *Geranium nepalensis, Colchicum luteum, Primula spp., Anemone spp., Dipsacus mitis, Doronicum roylei,* etc.

Fauna: Himalayan musk deer, apart from other rare and protected species like the leopard, brown bear, black bear, red fox, etc.

Avifauna: Pheasants and upland birds apart from other migratory and resident birds. The principal species being koklas, monal, Himalayan snow cock, bearded vulture, griffon vulture, chukar, Kashmir roller, European hoopoe, golden oriole, etc.

Visit:	Mammal viewing	.... September to March.
	Bird viewing	.... March to May.
Dress:	Spring	.... Trekking shoes, raincoat and light clothing.
	Winter	.... Trekking shoes, waterproof windcheater and heavy woollens.

For further information contact:

The Chief Wildlife Warden,
J & K Government,
Tourist Reception Centre,
Srinagar 190 001,
Kashmir.
Phone: 75411.

The Wildlife of
Jammu & Kashmir

Sanctuary *magazine and the State of Jammu and Kashmir have enjoyed a special relationship for years. Time and again, the rich and variegated life of this Himalayan realm has been the focus of photographically-supported articles in the journal. This compilation possibly represents the best selection of wildlife material emanating from Jammu, Kashmir and Ladakh published in recent times. In spite of high costs it was possible to publish this profusely-illustrated compendium at a cost of less than $2/-(Rs.20/-) only because of the far-sightedness and support received by us from the Jammu and Kashmir Department of Wildlife Protection.*

These articles are not intended to serve as biology or botany guides to the flora and fauna of the region, though the contents are, of course, authentic and exhaustive; rather we hope to give the reader a 'feel' of the natural wealth of the region. The tourist information contained herein will serve to guide people to some of Jammu and Kashmir's exquisite parks and sanctuaries and it is hoped that those who avail of the opportunity will discover for themselves some of the joys of nature in this Himalayan haven.

CONTENTS

Cover transparency: Ashok Nath

The Hangul

Dachigam's endangered deer

Photographs & text by Joanna van Gruisen

The hangul, or the Kashmir stag as this threatened deer is sometimes referred to, is a classic example of the predicament in which humans and animals find themselves today. Whose needs come first—the animals' or the people's ? The hangul's future is totally dependent on the health of its habitat—The Dachigam National Park. Ironically, the future of Srinagar is also intertwined with this area of devastating beauty as it forms the catchment area for a bulk of the city's fresh water supply. Through the eyes of the author, a naturalist and photographer who spent over a year in Dachigam, we gain an insight into the splendour and fragility of this Himalayan wilderness.





How does one even begin to describe Dachigam, the home of the hangul? Geographically and aesthetically, perhaps, I should begin at the small tranquil lake of Marsar which nestles between towering ridges reaching up to 4,000 metres and more. Rivulets of water drain from these ridges to add to the lake's own perennial spring supply. This icy-cold, crystal-clear water moves through glacially flattened rocks surrounded by a rainbow of flowers amongst which the longtailed marmots (*Marmota caudata*) have their burrows. Their high-pitched calls echo across the valley, reverberating on either side of the stream where they feed amongst the boulders or perch up on their hindquarters to get a better view of their world. This is also brown bear (*Ursus arctos isabellinus*) country and though very rare now, reports of sightings still come occasionally from the Bukarwal graziers who pass through with their goats in summer. Redstarts, pipits, finches and grey wagtails are commonly seen hopping near the water's edge; Himalayan rubythroats, Alpine accentors and wallcreepers are the other attractive birds here while the lammergeyers, griffons and choughs soar overhead.

The waters roll on, meeting elegant stands of silver birch as they move into the tree-line and continue to flow past tall dark conifers that edge their banks. The green of the summer grass is rivalled only by the gold, purple and crimson of the carpet of flowers. These are the hangul's traditional summer feeding pastures; here they feed and play, their amazing energy expended in apparent joy, chasing each other up and down the steep inclines. Here, the habitats of the brown bear and the Himalayan black bear (*Selenarctos thibetanus*) overlap and both are seen occasionally. The Himalayan grey langur (*Presbytis entellus*) also resides here, his bushier coat giving him a larger, more appealing appearance than that of his plain dwelling relatives. Amid these trees the redbrowed finch is often seen and Eurasian goldfinches, tits and flycatchers move through the branches in noisy feeding parties.

The stream tumbles on, dropping steadily as it moves down to Lower Dachigam, flowing past well-wooded banks so that on its arrival at the park's gates, only 21 km. from Srinagar, the waters flow just as clean and clear as they did on leaving Marsar. This water clarity persists almost throughout the year, turning opaque for a short period in spring when a snowmelt causes mud and silt to colour the stream.

The fresh water which flows through Dachigam is an important source of sustenance for the people of Srinagar. This fact was recognised as early as 1910 by Maharaja Hari Singh and was a crucial factor leading to the preservation of Dachigam—then as a private hunting ground, and now as a National Park. For once, the interests of humans and those of wild animals can clearly be seen to coincide; the steps necessary for preserving this vital source of water for the state's capital being synonymous with those that aid the survival of the wildlife of Dachigam. Dal Lake, with its houseboats, its romance and beauty which attract tourists by the thousands every year, depends largely on Dachigam as it forms almost half of its catchment area. In spite of the pivotal role played by the Dachigam area in the lives of thousands of Kashmiris its history, along with that of the hangul's, has followed a chequered path.

Until 1947 the hangul were 'royal game' and the animals and forest enjoyed strict protection and care from the Maharaja. Between 1910 and 1934 all habitation was removed from the catchment area and the people were resettled on land outside (hence the name Dachigam or "ten villages"). There is no record of the number of hangul at this time but E.P.Gee estimated that at the turn of the century there may have been between 3,000 and 5,000 and in 1947, perhaps, between 1,000 and 2,000. Certainly those who can remember those days, recall forests teeming with animals and say that the male stags' roaring calls during the rut were enough to keep one awake at night.

In the confusion of the years immediately following Independence, Dachigam and the hangul were unprotected and inevitably widespread encroachment and poaching took place. In 1954, E.P.Gee estimated that the hangul had been so decimated that only around 300 animals remained—a reduction of around 85 per cent in only seven years.

Dachigam had been declared a sanctuary in 1951 but orders are ineffective without enforcement and hangul numbers continued to drop; in 1965 the figure was believed to have dwindled to 180. Writing in the BNHS journal in the December of that year, Gee noted that in spite of the area's status as a sanctuary, "nothing appears to have been done to implement the order." Responsibility passed back and forth between departments, while the hangul and its habitat continued to suffer. The most serious threat to its survival was poaching. In 1970, Dr. Holloway estimated that only 140-170 animals remained and that their range was drastically reduced. It once extended in a 65 km. wide

arc north and east of the Jhelum and Upper Chenab rivers in the Vale of Kashmir from Shahrah in the north to Rhamnagar in the south. But, as a water catchment area, a much bigger threat for Dachigam was the presence of graziers. They brought thousands of sheep, buffaloes and goats to feed on the lush high pastures of Upper Dachigam, which border the stream's course from Marsar downwards. The area "seems to be overgrazed, with erosion becoming apparent," noted George Schaller in 1969. Pine forests and silver birch stands were being thinned as the graziers used the trees to build their homes. Pursuance of this policy would pose a serious problem and result in the destruction of the clear water supply provided by the Daghwan river with concomitant wide-ranging effects on the Dal Lake, the population of Srinagar and ultimately Kashmir in toto.

As if the threat of summer graziers was not enough, a Government sheep breeding farm took a four square mile chunk out of the Lower Dachigam area (prime hangul habitat). Additionally, the farm laid claim to the grasslands on the south facing slopes of Dachigam up to the Draphama VIP bungalow and a little beyond. These grasslands are now a rarity in the Himalayas and were already suffering because of sheep grazing as confirmed by M.K. Ranjitsinh in 1969. What is worse, the sheep also move into the Daghwan valley in the summer months thus compounding the damage inflicted by the goats, buffaloes and sheep of the Bukarwal graziers higher up. The presence of sheep naturally increases the danger of disease as was illustrated in 1977 when a captive hangul in an enclosure died of Johne's disease believed to have spread from the nearby sheep farm. Should, heaven forbid, such a disease spread amongst the wild population, there is always the chance that this, the most beautiful of the red deer species, may be wiped out forever.

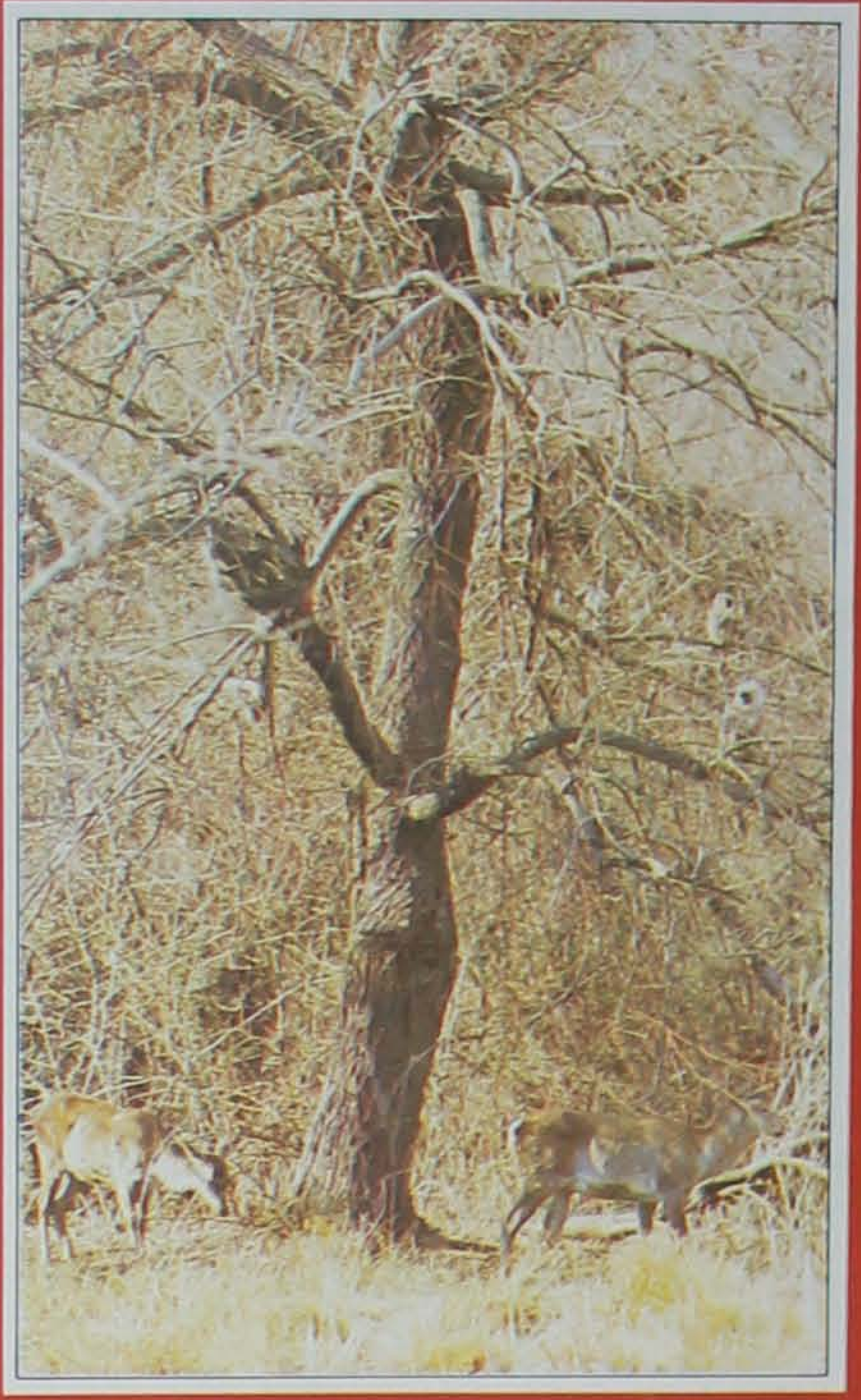


Related to the red deer of Europe, the hangul is characterised by its white rump patch and impressive spread of antlers.

For the moment the south facing grasslands have received a reprieve—the problem of deterioration was recognised in time and the Dal Development Fund is financing the erection of an eight-foot-high chain link fence around the sheep farm area confining the animals to it during the winter months. However, the sheep farm continues to pose problems—for their winter feeding, grass is cut in large quantities from within the park and this is done during the hangul's rutting season and in its rutting area. The disturbance of the men and lorries carrying out this activity confines the hangul to an even smaller area during the crucial mating season and this could have a serious effect on the hangul's breeding ratios. Besides, the grass cutters' presence results in numerous grass fires such as the one we witnessed in the autumn of 1981 which sprang up as the last bundle of grass was being carried from the hillslope!

Dr. Fred Kurt, who studied the hangul in Dachigam until 1979, recorded that "during the present survey it was found that hangul do not occur within Upper Dachigam with the exception of a few straying animals" whereas previously a definite summer migration to the higher pastures had been recorded. It was around this time that a high percentage of the Gujjar, Bukarwal and Banyari population was removed from the area. Now, in the closed Nagbaren valley, hangul are seen once again in the early mornings and evenings. There seems to be a strong correllation between the presence of graziers and the problems of the hangul; if domestic livestock can be removed totally from Dachigam, the hangul will undoubtedly once again play and



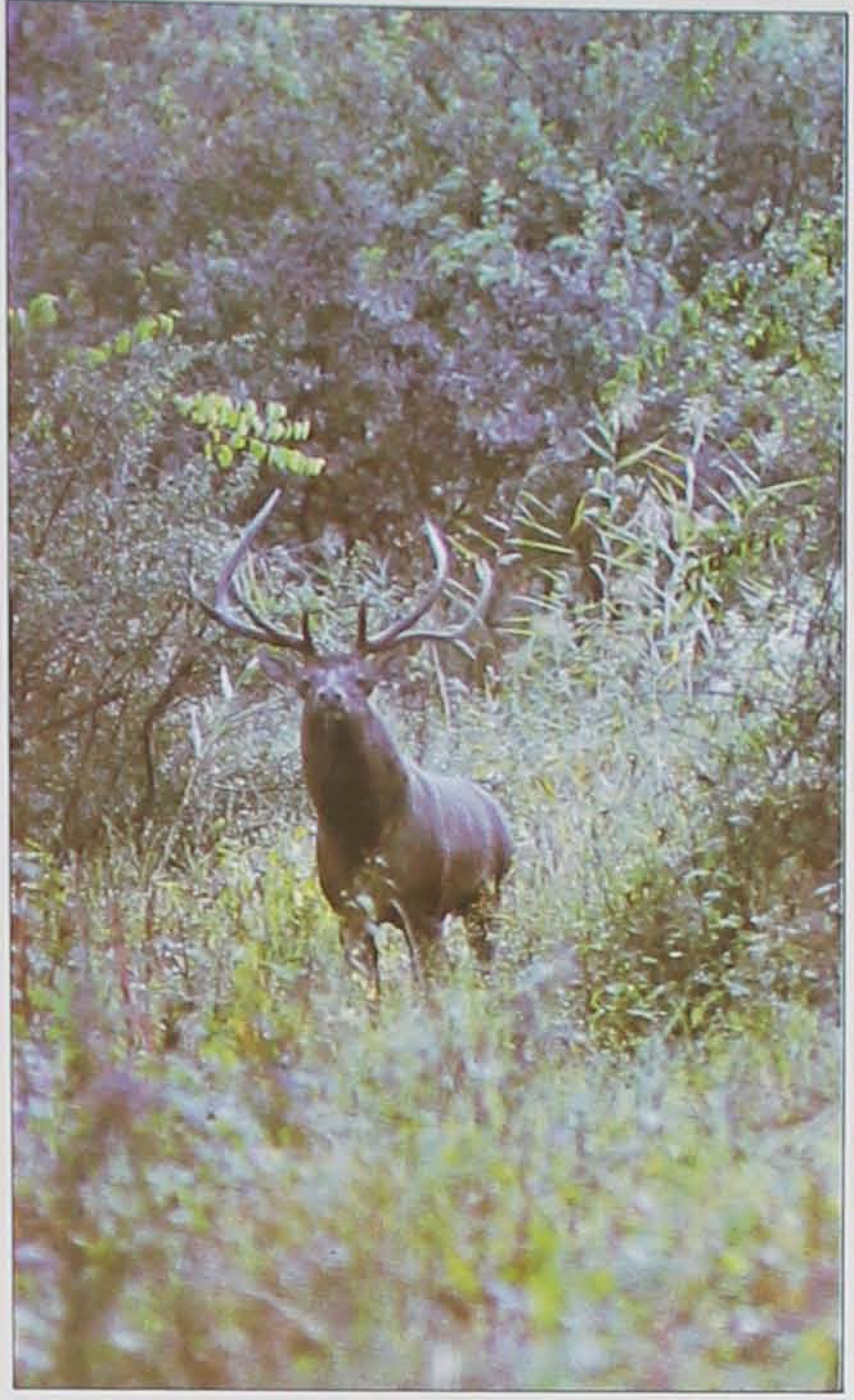


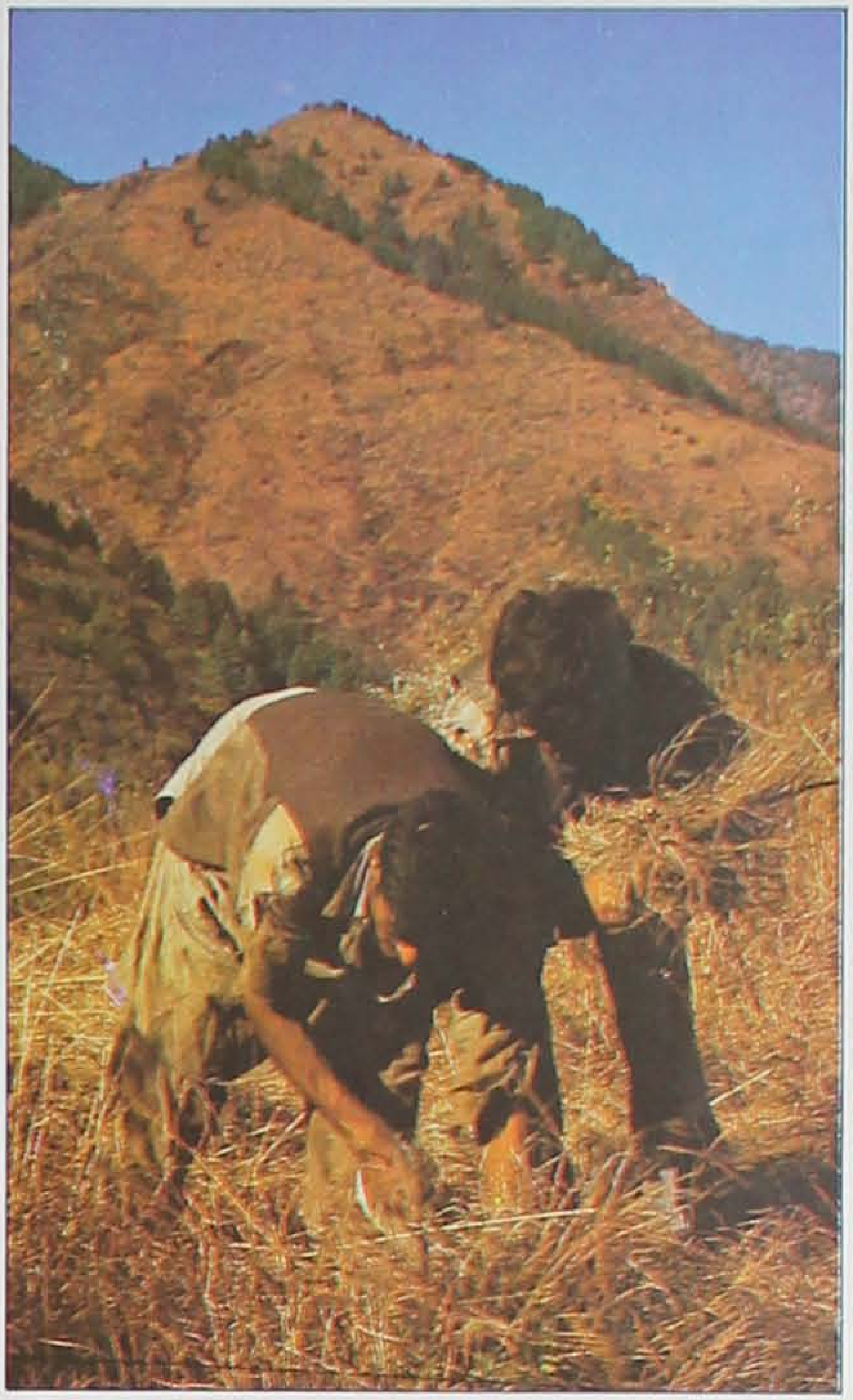
A hill fox **(above left)** curls up in typical dog-like fashion to conserve body heat. Caught napping by the author in broad daylight, the fox, mainly a nocturnal predator, preys on small game such as partridges, pheasants, marmots, squirrels and voles. **(Above right)** An ancient jungle partnership: langurs messily feed on new shoots in early spring, dropping much of their forage which is eagerly eaten by the deer waiting below.

feed, undisturbed amongst the flowers and lush grasses of these stunningly beautiful pastures.

Anyone seeing the difference between those denuded valleys that have been grazed upon and those left ungrazed for five years will immediately realise the need to lobby hard for locating alternative sites for the graziers. I have never been more spiritually affected by a landscape, nor witnessed such beauty as I beheld in Upper Dachigam. So long as any graziers remain, this potential beauty can never be fully realised as even those valleys which are officially closed are threatened by their presence since the terrain is difficult to patrol.

But, aside from these two continuing problems of grazing and the sheep farm, (for which, hopefully, solutions will be found in the near future) the situation in Dachigam has improved considerably over the last decade. This is illustrated by the arrest in the decline of hangul numbers and the gradual increase from 140 in 1970,. to 320 in 1979 to perhaps, 440 now. The single most important factor has been the reduction in poaching incidents although, sadly, hangul are still occasionally shot in spite of the Schedule I Protected Status afforded them. Regular patrolling by wildlife guards has, however, ensured that "poaching is no longer a limiting factor" as stated by Dr. Kurt. It is interesting to note that effective protection from a Wildlife Department *can* save a species from extinction. The Jammu and Kashmir Government should be congratulated on their achievement as their task is not easy and several factors work against the department's ability to fully and efficiently protect the area from encroachment and disturbance.





A major hindrance is the number of different departments involved in the National Park—Hospitality and Protocol, PWD, Irrigation and Water Works, Electricity, Telephones, Agriculture and Fisheries, to name a few. According to Gee, in 1965, there "does not appear to be much, if any, coordination between them and they all seem to act independently of each other." The most obvious adverse effect of this is the high number of people who enter the park daily with, in most cases, no interest in the preservation of the area or its animals. Sadly, the VIP bungalow at Drapahma is probably the biggest cause of this disturbance as the five km. stretch of road leading to it runs through a core area of the park and the employees, who regularly travel along it, have no regard for the flora and fauna here. The staff of the sheep farm appear to be of the same mould—some of them were even caught throwing stones at hangul in the forest! With so many different departments involved it is almost impossible for the Wildlife Department to maintain control over every movement in the park.

However, it is an indisputable fact that the Directorate of Wildlife Protection is now doing a good job, with some financial aid from the Dal Development Board, in protecting and preserving the critical water catchment area and the many rare and endangered animals found within its boundaries. A progressive step which bodes well for the future of wildlife and its habitat in Jammu and Kashmir has been the separation of the Wildlife and the

A handsome stag **(above left)** peers out of a jungle clearing. Just a few years ago, before effective anti-poaching measures were implemented in Dachigam, such stags were mercilessly butchered for their prized 'crowns' by hunters who worried little for the hangul's precariously endangered existence. The establishment of a sheep breeding farm in Dachigam was an act of amazing short-sightedness as the presence of domestic animals places unnatural pressure on wild pastures. Here **(above right)** grass cutters from the sheep farm denude hillslopes which should ideally be left alone for wild ungulates.

Forest Departments. Wildlife is now an independent department, with the Chief Minister, Dr. Farooq Abdullah, at its helm.

A personal view

When I arrived here in late September with Ashish Chandola to film and study the hangul, our first view of the Vale of Kashmir was one of rice fields partially harvested, gold and glowing under the setting sun. If anything, Kashmir's breathtaking panoramas were only further accentuated in Dachigam National Park. The golden-pink of dry grass dominated the south facing slopes. On the other side dark green slopes had just begun to take on autumn colours and the *nalas,* thick with *Parrotia jacquemontiana,* were dotted with Indian horse chestnut and walnut. The hillslopes were shrouded with pine forest, with some open patches studded with apricot trees. The entire habitat represented a very unique, though threatened, eco-system. As autumn advanced, the leaves on the trees responded by changing hue and falling. Different species were easy to distinguish—willows, poplars, oaks, elms, mulberry and other fruit trees and the majestic chenar, the last to retain its stately burnt-orange beauty before the bareness of winter set in.

Autumn is the rutting season for the magnificent Kashmir stag. After summer they collect in the lower area of the park, mostly in the Numbal beat and the surrounding lower slopes and *nalas* (an area of a mere 16 sq. km.). Here, in late September, the rutting calls of the males reverberate through the forests and across the slopes. Although we heard calls at different times, the highest concentration was between 9.00 a.m. and 10.00 a.m. and in the late afternoon. As Schaller had discovered earlier, we too observed a definite correlation between the frequency of hangul calls and the weather. In fact, throughout the year we found that hangul behaviour and weather conditions corresponded—during dry periods, particularly in the Numbal area, hangul were far less visible than they were after rain or snow.

Being extremely wary creatures, living mainly in heavily wooded areas, it is difficult to make accurate, detailed observations of the deer. However, it did appear that during the rutting season single males and to some extent female groups also, would remain confined to specific areas. But these areas appeared to be non-exclusive and in one part, over a period of three weeks during the rut, three different males were seen at different times at the same place, each calling to others. However, we saw no direct confrontation. Occasionally, males will do battle and I watched one rather impressive shoving match between a large ten pointer and an eleven-pointer stag during the 1981 rutting season. This is a rare sight as the calling serves to keep males separate and maintains the hierarchy. The general rule seems to be that the large males consort and mate with females first and on their tiring and moving away, to rest and feed on slightly higher slopes, the younger males move in to serve any females late in coming into oestrus. There are always exceptions and during the 1982 rut one large ten-pointer was seen, throughout the two month period, calling and relating to females. After the second week of October the number of rutting calls diminishes and comes to an end by the third week of November. (An odd call may be heard out of season—we noted one such call on February 15, 1982.) With the rut over and winter approaching the hangul rest and feed. The Indian horse chestnuts now ripen and fall and are quickly eaten by the deer. In fact, it is from their partiality to these nuts that the hangul gets its name—"han" being the Kashmiri term for this tree.

The Himalayan black bear who was seen frequently in autumn, filling his ample belly with acorns, walnuts and *brimji* fruit, now moves into hibernation and will not be seen until the spring. Dachigam must be the best area to view the black bear, especially in September when the acorns are ripe—in a memorable walk through the forest once we counted no less than twelve different individuals within five hours. In spite of the great fear which these animals instil in many people, we found, as with most wild creatures, that if they are treated with respect and caution, aggression towards humans is not a part of their nature. However, it is not advisable to walk alone in a forest where bears roam, as it is easy to suddenly come upon one in a bush or up a tree. At such times neither you nor the bear are aware of the other's presence until the distance gets too close for comfort. In such a situation particularly if the bear is a female with cubs she may well charge. There is some truth in the belief that if a she bear is faced with more than one opponent she is unlikely to attack and, in fact, nervous mothers choose to turn at the very last moment, as we gratefully experienced several times. On one occasion, however, when Ashish was out in the forest in the morning twilight with a wildlife department guard, he inadvertently walked close to two small cubs obscured by the tall grass. Suddenly, a huge black form came hurtling towards him

and knocked him to the ground; fortunately he was able to kick his way out of the situation so that when the female bear made off with her two cubs she had left no more damage than a badly torn trouser-leg and some superficial scratches.

But from December through March we could walk the forests fairly fearlessly. We were hoping to see and film one of the leopards which moves down to the Numbal area to prey on the hangul, horses and any domestic livestock that may be there. We regularly saw tracks in the snow and surmised that there must be at least seven different individuals in the park. We also saw eight hangul kills with distinctive leopard puncture marks in the throat.

The grey langurs also winter in this lower area of the park and move around in large mixed groups, often of 60 and more. Their winter diet consists mainly of tree bark and many poplars were in danger of being ring-barked by them (as single branches often are). Amazingly, several of the wildlife department staff claimed to have seen langurs feeding on a hangul carcass and we longed to be able to verify this for ourselves. Unfortunately, we were not eyewitnesses to any such event though, on one occasion, when we went to examine a young stag killed by a leopard near the park's perimeter, there was a troupe of langurs in the trees nearby and the guards who had come to the carcass earlier told us that the monkeys had been on the ground around it before they had arrived and disturbed them. Could it be that the rigours of Dachigam winters have forced them to abandon their normal vegetarian diet?

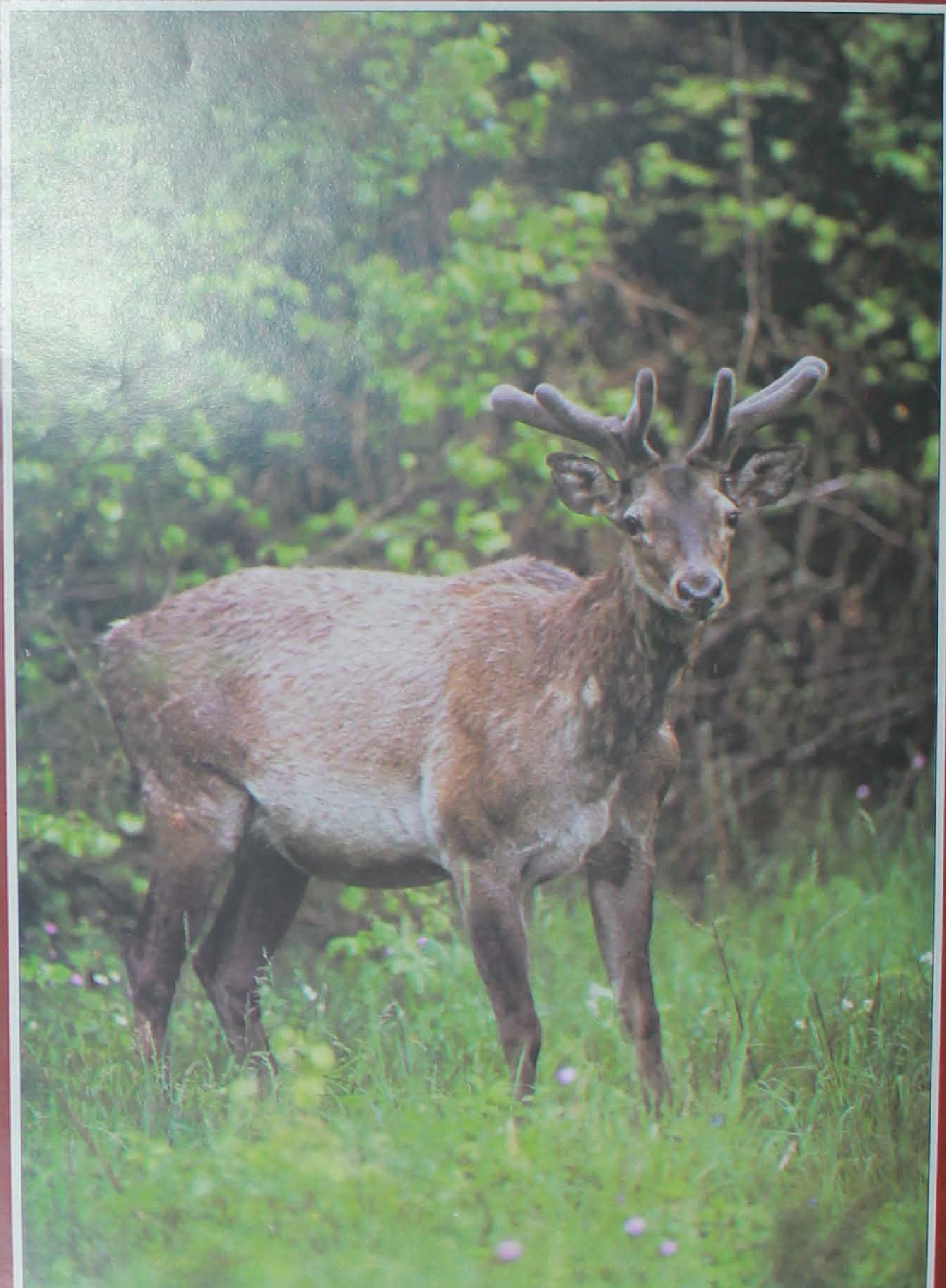
More certain scavengers to be seen on leopard kills include wild

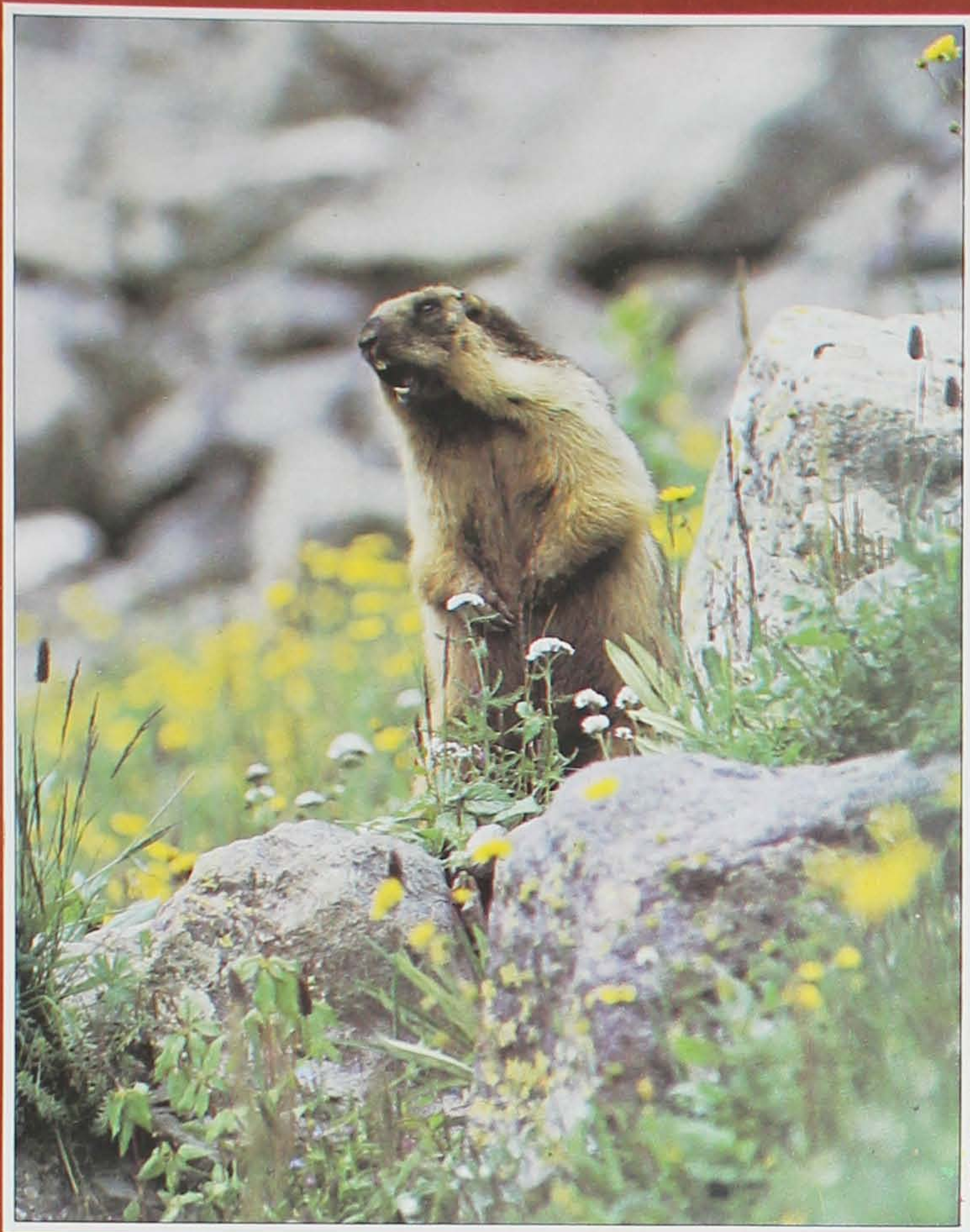


boar, jackal, fox, Himalayan griffon vulture, lammergeyer, blue magpie and of course, outside of winter, the black bear. In fact, the latter is not only a keen scavenger but will also predate, mainly on hangul calves in the first days of their lives when the hinds leave them hidden in the long grass on the slopes. It is then that the bears can be seen traversing the slopes daily, sniffing out the still almost helpless calves. Last year, we finally concluded that perhaps a sizeable number of calves were lost in this way as the newborns were not as evident as they had been in previous years. We would see pregnant females and later in the same area ones who had presumably already dropped their calves, but without their young. Only once, outside a fox's den, did we actually find the remains of one, so it is not possible to say for certain how many are lost in this way. Bears may also occasionally bring down an adult hangul should it be handicapped in a way that prevents it from outpacing its far slower enemy. We guessed that a stag in velvet with a large swelling on its shoulder and emaciated neck, a result perhaps of lead poisoning from a poacher's bullet (*see photo on page* 116), may have been killed in this way as we found its carcass a couple of days later, almost completely eaten by bears.

The wild boar is almost certain to be found feeding on a winter carcass for this is a tough time of the year for it. Not indigenous to the area, boars were introduced by the Maharaja for hunting, from the Jammu region. At one time they used to be fed and sheltered through these lean months. Now

(Overleaf) The rigours of winter take a heavy toll on wildlife at high elevations. To survive, the animals must be assured of an abundant food stock in summer so that the fat accumulation in their bodies can be metabolised when fodder is unavailable during the lean months.





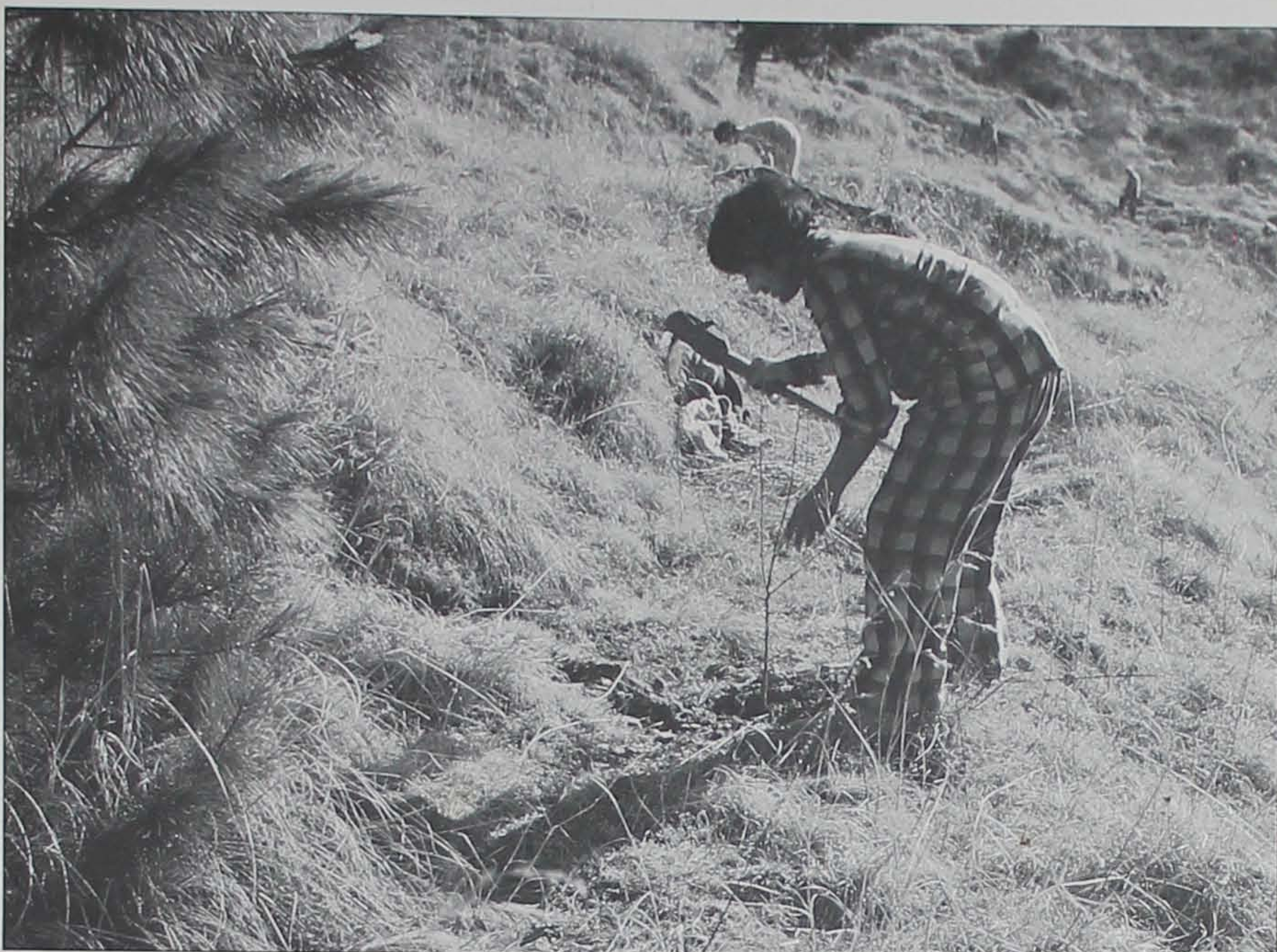
A longtailed marmot (Marmota caudata)*: a member of the squirrel family* (Sciuridae)*, in an upper Dachigam flower pasture* **(above)**. *The high-pitched calls of marmots can be heard echoing across valleys where they feed prior to their long winter hibernation. This hangul stag* **(facing page)** *its antlers still in velvet, was suspected by the author to be the victim of a poacher's bullet. Just two days after this photograph was taken the animal's carcass was discovered almost totally consumed by bears.*

that they have to fend for themselves, they seem to be dying out in Dachigam which is an unnatural habitat for boars. No young are to be seen and only half a dozen or so very ancient and apparently rheumatic individuals remain. They build shelters for themselves out of pine needles, dry leaves or branches but last winter they were also able to take advantage of the hides that we had constructed around the park. In our view, it will not be long before Nature recreates her old balance and the wild boar in Dachigam dies out.

Surprisingly, few jackal are seen inside the park though there are a number of feral dogs, another offshoot problem created by the presence of the sheep farm. We would regularly see them worrying the langurs and disturbing the hangul and there was evidence of them killing the former. Foxes are, of course, mainly nocturnal but on a few occasions we surprised individuals still about during the day and once witnessed a youngster in hot pursuit of a yellow-throated marten which eventually took refuge up a tree where it remained until the fox tired of waiting. Had they engaged in battle they would have been equally matched opponents and I would not have wagered on the outcome.

Winter gave us the chance to see a few tracks left by small cats in the snow but we saw no animals ourselves, however, the leopard cat (*Felis bengalensis*) is believed to be present. We did see a common palm civet, but whether a





Ashish Chandola

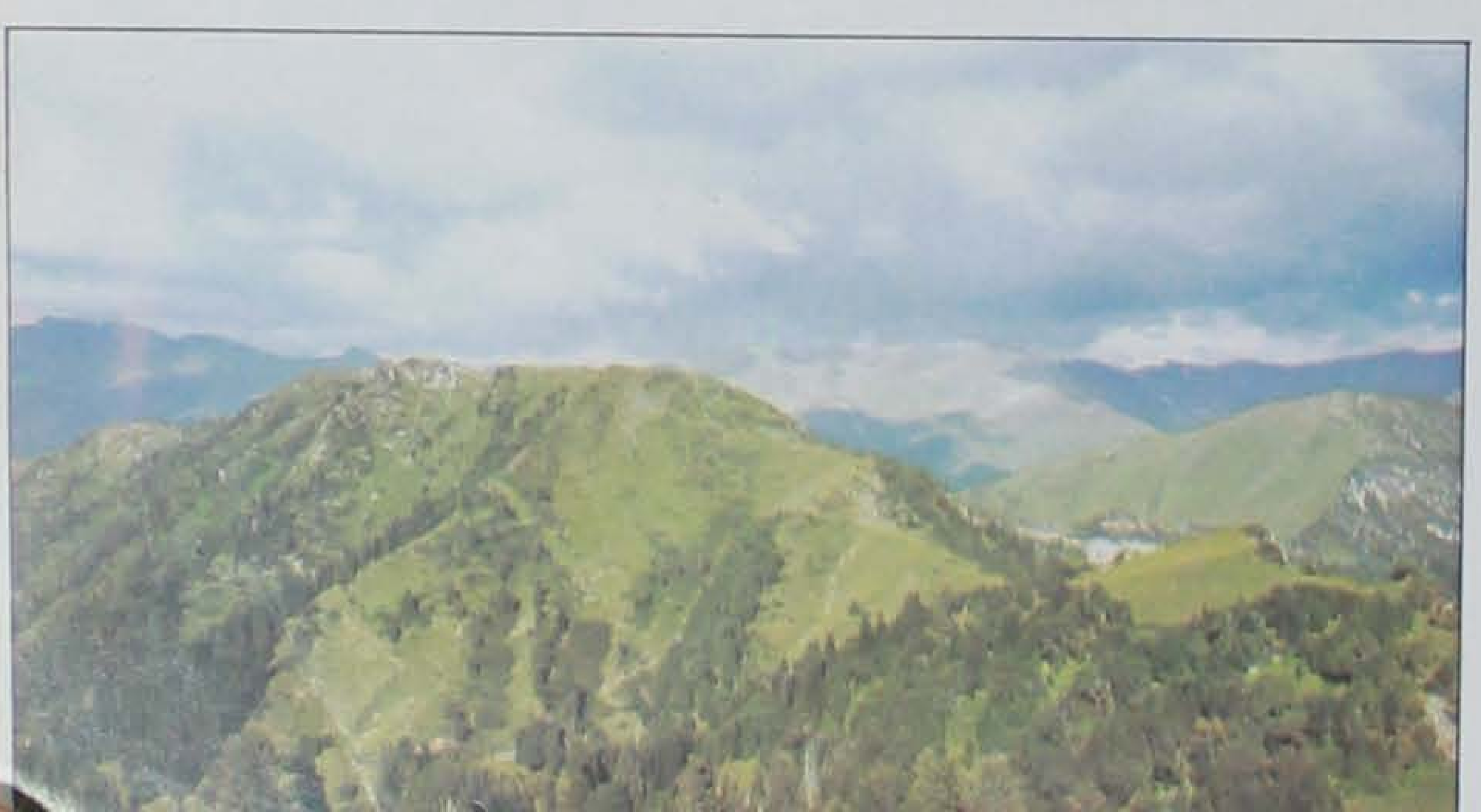
Two aspects of human endeavour in Dachigam are depicted here. Above we see a sapling being planted on a grassy slope, as part of an urgent reforestation programme that conservationists are trying to put into effect. On the facing page a Bukarwal grazier shears his sheep in the heart of Upper Dachigam. The adverse effect of sheep grazing may well negate every effort being made by conservationists to save Dachigam.

truly wild population exists is unknown as this individual may have escaped three years previously from one of the cages, which houses orphaned animals near the park gates. By far the most exciting aspect of winter in Dachigam was the viewing of hangul in large numbers. Herds are formed by both sexes, more or less exclusively, and we once counted 42 males in one group (and three females). At the salt licks, where a certain amount of food is also put out to help them through the harshest weeks, over 60 individuals were counted at one time. On a two hour walk through the snowy forest we counted well over a hundred hangul—an exciting experience after the dry, unrewarding, empty weeks from late November to the middle of January when we barely saw one animal. This was, however, an unusual situation as normally the snows can be expected to arrive much earlier and so the hangul congregate earlier too.

By spring, in March and April, the herds are smaller again. The males begin to move up, out of the lowest areas and are seen rarely. They drop their antlers in April and the new growth in 'velvet' begins soon after. The females remain lower down longer and in these months may often be found where the langurs are—for very good reason. New shoots appear on the trees and the langurs, being messy feeders, drop much foliage giving the waiting deer a tasty feast which they would not otherwise be able to reach.







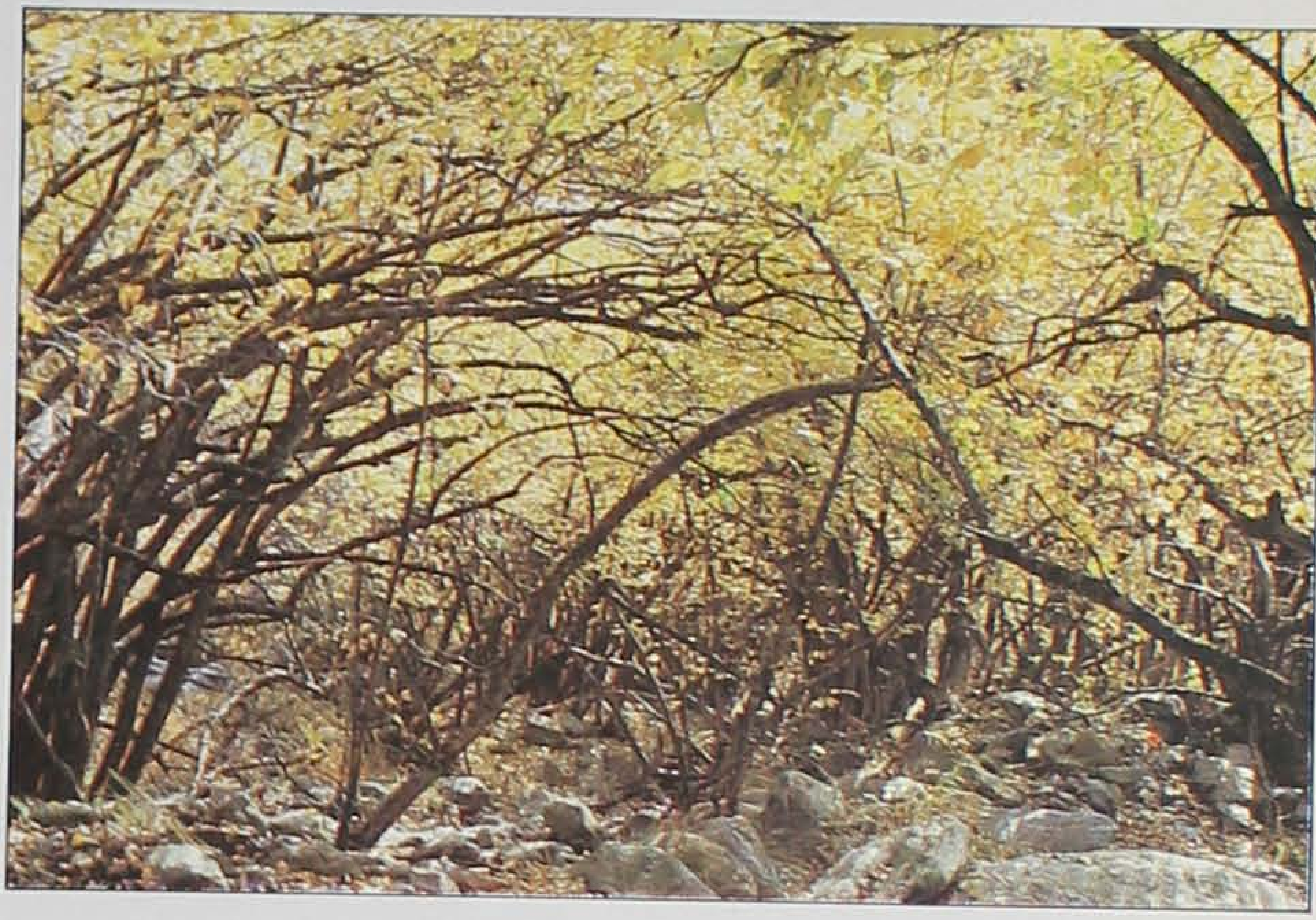
Two large hangul stags (**top**) meet in a rare rutting combat. Usually the hierarchy of groups is maintained by their calling which serves to establish territorial rights, thus keeping the males apart. Ever watchful, ever alert, a group of females and young (**centre**) attempt to echolocate the author who is concealed in a natural 'blind'. Upper Dachigam (**bottom**) where the contrast, between the overgrazed, naked brown slopes in the foreground and the lush green of the far slopes, is clearly visible.

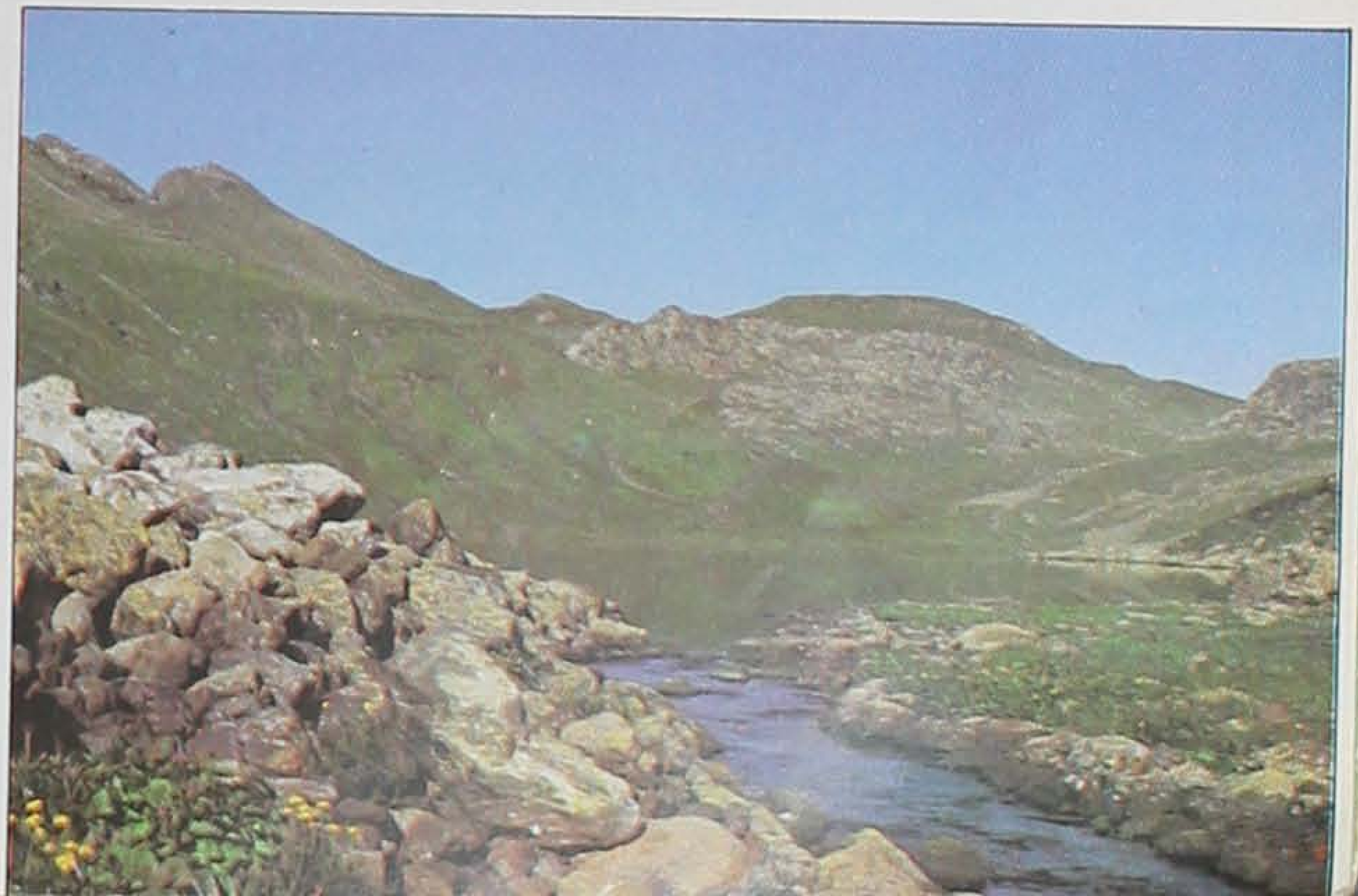
Having experienced its serene white beauty Dachigam has moved into the richness of spring. After the drab colours of winter the delicate hues of spring are delightful. The innumerable variations of green of the new leaves are speckled with a profusion of plum, apricot and peach blossoms and the *nalas* are thick with the creamy abundance of parotia flowers. It is a lovely sight. The hillslopes turn verdant and the valleys dark, under the thick canopy of developing leaves. Fruits begin to appear much to the bears' delight—mulberries come first and in abundance; plums, cherries, apricots, peaches, pears and apples follow; later still, raspberries, strawberries and blackberries—a veritable fruit paradise. Meanwhile, the hangul's cycle continues, May and June being the calf dropping season. In summer few hangul are to be seen in the lower Numbal area and no monkeys. As the snow recedes and spring moves up, the animals follow, and so did we.

There are, thankfully, no roads to these areas so we loaded equipment and food on to Zanskari ponies and set off on foot towards the source of the Daghwan at Marsar Lake. Having been completely swept off our feet by the beauty of Lower Dachigam we were unprepared to find that the upper areas, unbelievably, are even more beautiful. The vast rolling green meadows, the extreme profusion of flowers, the bubbling clear water, the waterfalls, silver birch,

A field of flowers **(top)** in upper Dachigam near Marsar. It is easy to be moved by the beauty of such remote, pristine areas but very few realise the importance to the entire subcontinent of maintaining the ecological health of such Himalayan habitats. **(Centre)** Sunlight filters through the foliage of *Parrotia jacquemontiana* trees in a *nala* in Dachigam. Marsar lake **(bottom)**, where the purest of streams form the beginning of the Daghwan river, a source of fresh water that finds its way down to Srinagar's famous Dal lake.







blue Himalayan skies and high ridges combine to form a sight as close to perfect beauty as can be imagined. Marsar, above the tree-line nestling in a hollow surrounded by 14,000 foot ridges, inspires indescribable emotions—one can easily spend hours sitting peacefully by its clear waters imbibing the wonder and harmony of Nature. Companions here are the longtailed marmots sunning themselves on boulders or scuttling amongst them to disappear down a burrow after loudly screeching their presence; or moving through the flowers, feeding prior to their long winter hibernation. Brown bears are still reported in the area but we were not lucky enough to see any. Below the tree-line are the black bear and hangul, summering in these vast nutritious meadows.

Come September and already some hangul stags start moving into rutting behaviour—before leaving Upper Dachigam we heard a medium-sized male call and chased a hind around a slope of the Sangerguloo Valley. But with winter fast approaching, biting night-frosts and the beginnings of snow led us to hurry down to lower elevations along with the hangul and monkeys who also began their descent to the milder climes. All too soon our idyll was over. Before our eyes the seasons had come and gone. For all the joy our experiences had brought us, how very reluctant we were to leave and thus be unable to share another year's cycle of beauty and peace in the last bastion of the hangul. □



Nature impressions of

DAL LAKE

Photographs & text by Helmut & Gertrud Denzau

Dal Lake, much visited little understood, provides us with a classic example of how little we appreciate the good things provided to us by Nature. This once-pure lake could turn into a polluted pond, if we unthinkingly allow soil erosion and untreated effluents to damage it. Thousands of residents of Srinagar, and millions of tourists are dependent upon the lake either for a livelihood or for enjoyment. The lake, of course, is most popular for its houseboats, shikaras and promenades. However, as these talented German photographers have discovered, and as can be seen in the following pages, it is without question a bird-watcher's paradise.

Slowly our *shikara* passed through the channels in Srinagar. Silently, we skimmed past houseboats and *duggas*, which even small children handled with dexterity. As wildlife photographers, we were repeatedly surprised to see how approachable the birds that resided near the lakes were. It was the month of July and common kingfishers *(Alcedo atthis)* sat nonchalantly on the roofs of houseboats almost within touching distance of humans who seemed equally unmindful of the birds. The kingfishers apparently use the walls, steps and piles as fixed perches from which to dive directly into the water to hunt for little fish. In Germany (where we also nature watch), we know these birds as rare and shy creatures, ready to vanish at the first hint of human presence. Consequently, in Germany, we must be content to see the common kingfisher, (the only kingfisher species in Europe) from afar. Why, we wondered, are the European birds so easily frightened, while in the 'Happy Valley' of Kashmir the same species seems to fear no danger from man? The answer lies perhaps in the fact that for many years European fish cultivators saw the kingfisher as a parasite that led to a depletion of their catch. The birds were thus extensively persecuted and often destroyed on sight. (Today in Europe, the kingfisher continues to suffer as its biotope is being systematically degraded and, above all, the waters which provide its sustenance are contaminated with industrial sewage containing heavy metal and inorganic solvents). Our fascination for India and its people stems from this very contrast in life-styles. Here in India, man and Nature seem to co-exist so peacefully.

For us Srinagar was really a stop-over on our trips to Ladakh and we visited the town and its beautiful surroundings several times in summer between July and October. In fact, the town has been the starting point for trekking tours and mountaineering expeditions since ancient times. Records reveal, for example, that Sven Hedin set off for Tibet from here in the beginning of this century. The lakes around Srinagar therefore, provided us with a most unexpected bonus, as what we thought would be mere stop-overs, proved to be highly rewarding birdwatching experiences.

Kashmir's magic has attracted tourists for endless years. Hill slopes of poplars, chenars, planes and willows clothe the land in varying shades of soothing green, with coniferous trees partly covering several ranges as well. The Jhelum river washes the capital of Kashmir, but the focal point of attention for most tourists and residents are the broad lakes north of the town. The most famous, the Dal Lake, is connected by a system of channels with the Nagin and Anchur lakes and here on the placid waters are moored the hundreds of houseboats that so typify the Kashmiri scenario. Communication from boat to boat or to shore is undertaken by *shikaras* as the 'floating taxis' are called. Sitting in these low boats, we discovered that we could manoeuvre ourselves so close to the many waders, divers and raptors, that photography was possible even with 200 mm. lenses attached to our cameras. For similar shots elsewhere, our experience showed that bird photography generally demanded tele-lenses of 500 or even 1,000 mm.

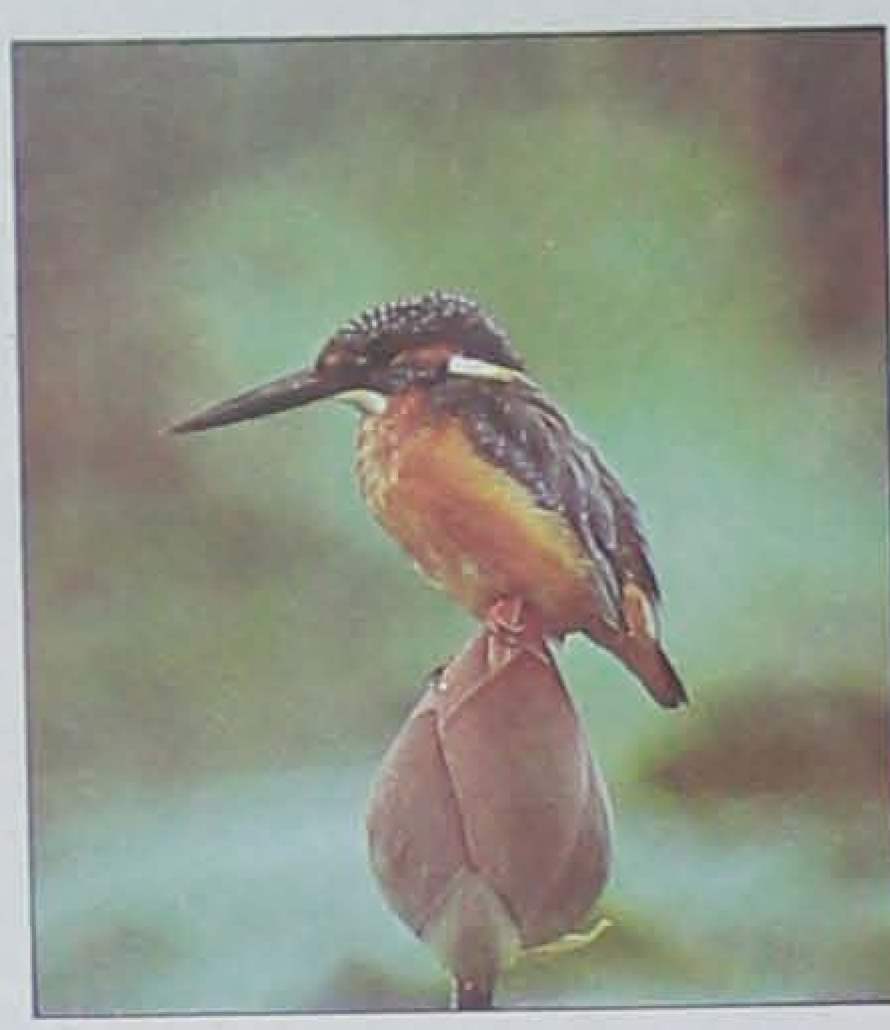
Gliding along the marbled waters, we often observed white-breasted kingfishers *(Halcyon smyrnensis),* large striking birds with robust bills, perched on the branches of willow trees. These birds seemed to concentrate their hunting efforts on the large floating gardens found in the lake. These man-made islands are comprised of reeds, willow rods and aquatic vegetation and are held together by a sort of humus consisting of mud from the lake bottom. This composition of weed and soil is extremely fertile and nearly all kinds of vegetables are cultivated here. Obviously, these patches of green provide *Halcyon smyrnensis* with a rich source of frogs, lizards, mice, grasshoppers and other insects, which is why the birds seem to converge here to hunt.

As we moved through the smaller channels on the way to the lotus area, we had some difficulty in moving the boat through dense aquatic weeds which choke the passage. Curiously enough the presence of such obnoxious weeds is a result of the pollution caused by the growing population of Srinagar and its environs. Nitrous and phosphorus deposits from the surrounding land serve as fertilising chemicals which cause excessive growth of weeds, algae and plankton. As sunlight cannot penetrate through the dense vegetation, many vegetable substances die and sink. The problem arises when decomposition causes oxygen to be consumed by bacteria and fungus. If the oxygen in the water decreases beyond a critical concentration, no life can exist in the water. We recognised the gravity of this problem from similar observations made in European lakes and rivers and we fervently hope that the lakes around Srinagar will not be allowed to die in this tragic fashion. Timely action against pollution seems to be the only long-term cure as physical clearing of the weeds would be both time consuming and uneconomical.

Reaching the clear waters of lake Anchar, we were very impressed by the scenic beauty and the silence. No motorboat engines could be heard and factories were too distant to make their presence felt. We found ourselves in quite another world. In the tranquillity that enveloped

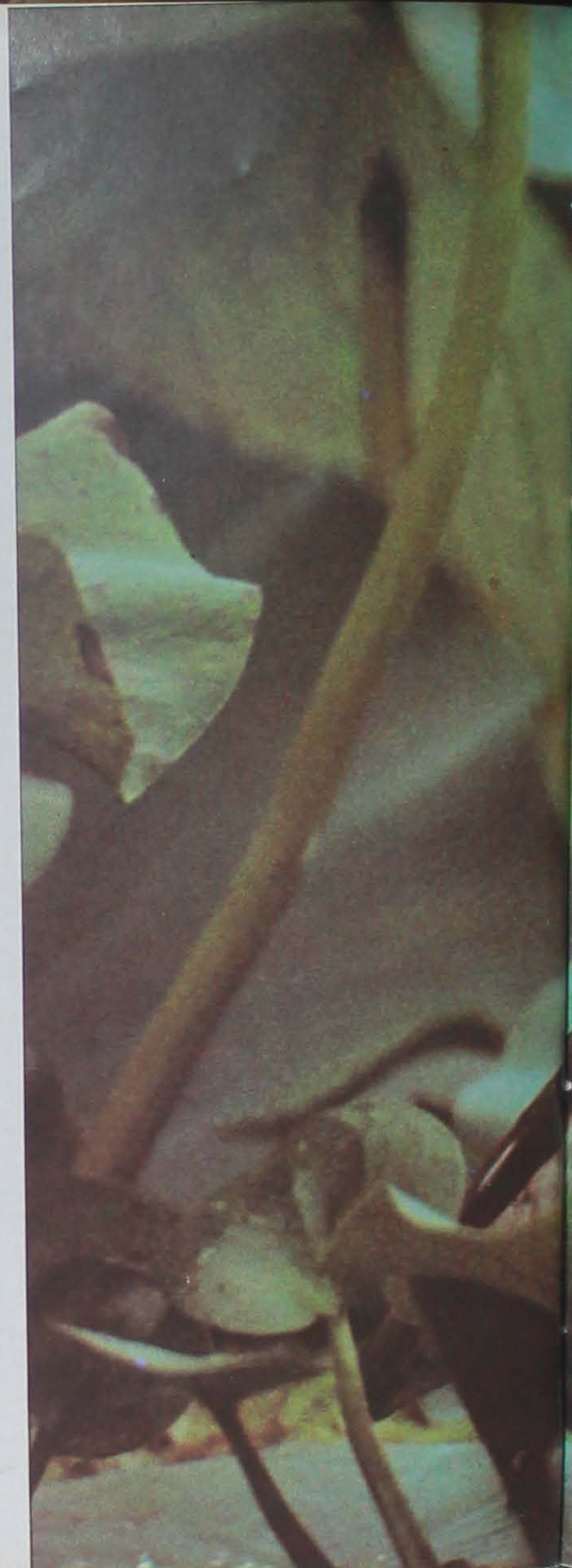
All photographs by Helmut Dezau/Gertrud Neumann



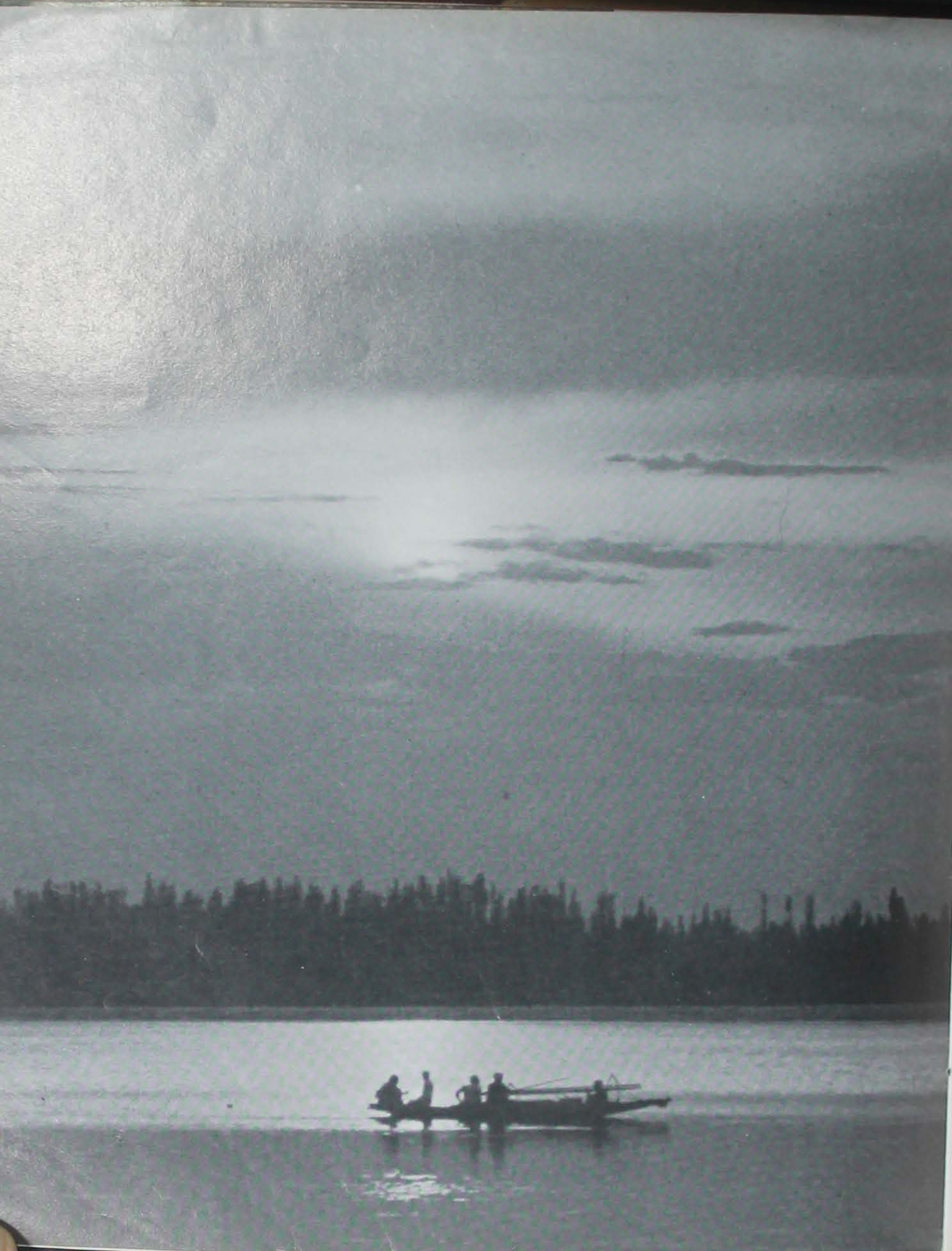




The feathered predators of Dal Lake: the pied kingfisher *(Ceryle rudis)* **(top)**; the common kingfisher *(Alcedo atthis)* **(middle)**; the white-breasted kingfisher *(Halcyon smyrnensis)* **(bottom)** and the little bittern *(Ixobrychus minutus)* **(right)**.







us, we began to comprehend the diverse moods that our minds were experiencing. Just yesterday we had been in West Germany, with all its hustle and bustle. A plane journey set us down at New Delhi,a connecting flight took us to Srinagar and then, less than 24 hours later, we were experiencing an inner peace the likes of which we could never dream of possessing in any large city.

Our dream state, however, did not prevent us from keeping a watchful eye for the varied bird life of the lakes. Just a few metres away from our boat we spied a small heron-like bird standing motionless in the reeds. A little bittern, unconcerned about the moving boat traffic, was conducting its everyday hunting chores. In our eagerness to photograph the bird, we asked the boatman to slow down, but to our dismay the bird vanished into the dense vegetation and would not emerge even after we had waited for a few minutes. Many attempts later we discovered the key to photographing this bird which, as in the case of the white-breasted kingfisher, was an extremely shy and reserved bird in Europe. Apparently, the continuous movement of *duggas* or *shikaras* does not alarm the little bittern, but our slow, concealed actions were translated as some sort of threat. With patience and the help of our skillful *shikara* man we were finally able to manoeuvre close enough to the bird and shoot pictures without interrupting the glide of the boat. We were careful, however, to see that the bird did not assume the upright frozen posture it is known to take in most other pictures we had seen. Along the highways in Europe we had seen the same reaction with birds of prey. As long as the cars are moving fast they are not disturbed, but when a car stops they take off at once.

The sounds of melodic songs, floating over the waters of the lake from some distance, gently awakened us from our semi-hypnotic state and returned us to reality, so to speak. There were groups of people cutting reeds or fodder plants on the lake. Their singing if anything exemplified the equilibrium between man and nature. Ahead of us stretched fields of lotus flowers. Having read something of the significance of the lotus in Oriental scriptures, we knew that this, the most beautiful of flowers symbolised purity, mental enlightenment and sacredness. The lotus grows from the darkness of the mud through the water surface and opens its blossom only after reaching the light, untouched by earth and water. In the same way the human spirit, contained within a mortal body, develops its qualities only after it has left the muddy floods of passion and ignorance. The murky power of the dark is thus transformed into the purity of nectar. This, in Buddhism, is the wonderful jewel *(mani)* in the lotus flower *(padma)* and the interpretation of the lamaistic mantra "O mani padme hum." Understandably therefore, open lotus flowers are a symbol for meditation. On our journeys through Ladakh we repeatedly saw frescoes in Buddhist monasteries and several *tankhas,* depicting meditating Buddhas sitting on lotus flowers, communicating between the formed and the formless world—between the dark and the light.

On a more down–to–earth, physical plane the perfect beauty of the open lotus flowers around us was indescribable. Buzzing bees were busy collecting the unique lotus honey, much of which would eventually find its way into the shops in Srinagar. Wagtails, active and eager, could be seen dashing from leaf to leaf sometimes leaping into the air to grab insect morsels. The dipping motion of their long tails and their undulating flight, so typical of all wagtails, was fascinating to watch. At a distance an Indian pied kingfisher *(Ceryle rudis)* flew over the still waters of the open lake. Suddenly it stopped to hover in mid-air, rapidly vibrating its wings like a kestral. Moments later, having spied a fish,it tilted its body and plummeted like an arrow straight into the water. Seconds later, in a shower of droplets, it emerged successful, a tiny fish in its beak. Obviously, these birds look for the best angle for sighting, where disturbing reflections from the water surface are minimal. Their difficulties are aggravated therefore, when the wind ripples the water surface rendering the fish invisible. The same problem occurs when it rains. In fact we found that it was invariably easier to take pictures of pied kingfishers during inclement weather, when the birds take time out to rest and groom their feathers.

A small swimming bird, much smaller than a duck, once dived quickly in front of our *shikara*. Remaining quiet and watchful we were delighted to see a little grebe *(Podiceps ruficollis)* emerging some metres away. It was, however, quite difficult to locate it a second time as it concealed itself noiselessly amidst a maze of nearby leaves and greenery. The little grebe is fairly common throughout the subcontinent but in Kashmir, at altitudes of about 1,800 metres, it has the highest area of its distribution.

Common pariah kites *(Milvus migrans)* are frequently seen soaring all over the area. Near the Dal Lake we saw them sitting on pillars or flying close to the lakeside possibly looking out for dead fish or other carrion. In Srinagar we observed large groups of these kites in big plane trees near rubbish heaps. As in the case of most large Indian cities, these very useful birds do more than their share to keep the streets clean.

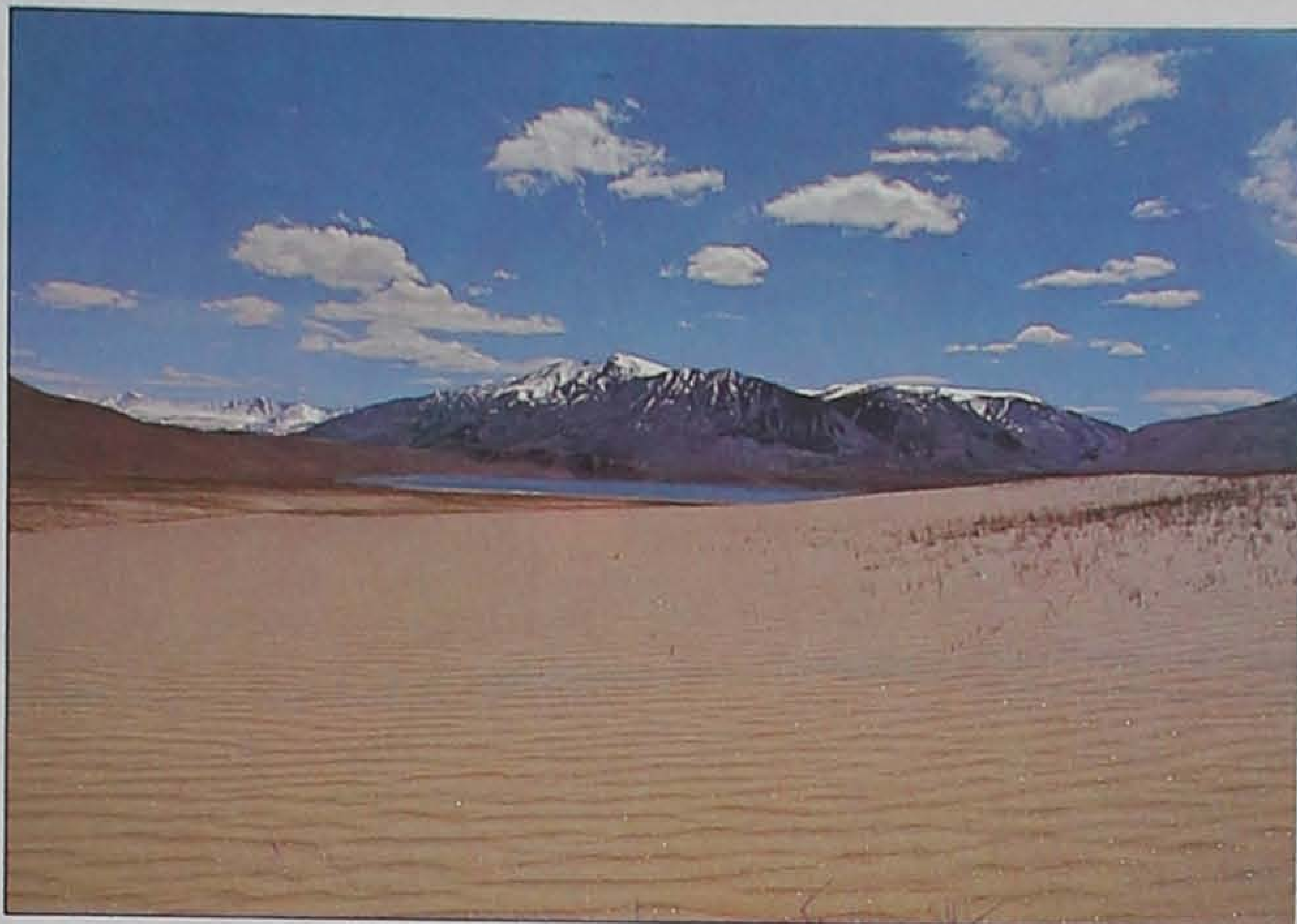
Nature and man must somehow work together to keep the water in the lakes around Srinagar clean. This means on the one hand purification of the

sewage and on the other protection of the water catchment areas to guarantee sufficient fresh water supply. We were pleased to hear about successful strategies in the Dachigam area in the Telbal Nullah where most of the waters for the Dal Lake and its backwaters originate. Too many sheep and goats feeding on the mountain slopes had destroyed the vegetation and erosion followed. With the rainwater, valuable soil was washed down into the lakes, thus reducing their size. Soil and vegetation conservation has now become very necessary in the catchment areas to ensure a continuous waterflow even in dry seasons. Recently projects have been started to reduce the sheep herds in the Telbal Nullah and to develop sources of income for locals, for instance,from the production of honey. Natural vegetation and undisturbed meadows with a rich variety of flowering plants and herbs can help in sustaining the bees. Projections indicate, in fact, that the return from 500 beehives is higher than that from the sale of wool from 5,000 sheep! If ecologically sound programmes are implemented, they will also benefit wildlife and will help to reduce the increasing incidents of conflict between brown bear and sheep.

All said and done, whether coming down from the deserts of Ladakh or coming up from large cities with their deserts of stone, it's impossible not to be impressed by the lovely valley of Kashmir. It is not necessary to have any special knowledge or equipment to enjoy birdwatching around the lakes near Srinagar. Just an ordinary tour on a *shikara* will provide an observant mind with many wonderful insights into bird behaviour. All that one needs are the usual pre-requisites for nature lovers, a keen eye, abundant patience and appreciation.


A little bittern photographed at the lake's edge from a shikara. Bitterns live on a variety of creatures including crustaceans, fish, frogs, etc.

A common kingfisher's shrill call and the gust of its wings as it flitted by unexpectedly close is as fresh in our minds today as it was the day we explored the waters of the Dal Lake. Many such instances speak volumes for the harmony between nature and the people that live on the Dal Lake. If this co-existence is to be perpetuated, however, a stable ecological balance in the Kashmir Valley must be established. And, if our European experiences are anything to judge by, we cannot leave this task to be accomplished too far into the future. To save the Dal Lake the future has to be created now. □



Ladakh

Text by Brigadier Moti Dar.
Photographs by Major General R.K. Gaur.

Ladakh is a mysterious land shrouded in myth and legend. Much of its ancient history is known only through the mythology of its people as its written history is of very recent origin. Known for centuries as the 'land of passes' (La—pass; Dakh—land), Ladakh was described by Fa-hian, who travelled across its inhospitable terrain in 399 A.D., as 'The land where snow never melts and only corn ripens'.

Its landscapes are forbidding by any measure. Snow-swathed mountains rise to several thousand feet above one of the most elevated plateaux on earth. A treeless wind-swept country, much of Ladakh can be termed as mountainous, Arctic desert, where everything is parched by the rarefied dryness of the atmosphere. Scattered here and there, a few narrow fertile valleys provide a stark contrast to an otherwise barren, beautiful country of intense sunlight and clear sparkling air. The limpidity of the atmosphere, in fact, gives the night sky a unique clarity, so full and bright with stars that one feels transported to some ethereal setting, far removed from Earth.

For endless years, before man had even discovered this remote land, several hardy animals and birds lived together here in an exquisite equilibrium. Circumstances have now changed, as they have almost everywhere else on the subcontinent. Today, Ladakh's flora and fauna are threatened and protection is vital if the ancient ecosystems are to survive the trauma of modern man. Through the fabric of this account runs a strong statement—that the armed forces' possible contribution to conservation remains untapped. Harnessing this vital potential force may be the single most important conservation advance India could make in the battle to save what remains of its natural wealth.

Less than twenty minutes after I first stepped out of the Jonga, I found it had gone—vanished in a drift of white puffy snow. The temperature that morning had dropped to minus 30° C and the wind-chill factor caused by the Himalayan blizzard robbed my body of almost all its residual warmth. I knew Ladakh well as I had spent a considerable amount of time here on active duty with the Indian army. Though my vision was restricted to less than ten metres, I could mentally 'see' the Karakorum range around me. The peaks—Kakset, Saser Kangri, K2—imposing, strong, perennial. For over two years this snow-swathed land had been my home, its people and its animals my companions and friends.

This mysterious "land of the passes" (*La*-pass, *dakh*-land) stands at a height of 4,600 metres in the outer Himalayas with its peaks, ranging from 5,800 to 7,600 metres forming the most striking feature of the area.

The Himalayas, higher than the mightiest mountains anywhere in the world, are clearly the result of a process of folding—a movement of the coastal plates by which one drifting piece of land overrides another. When two such drifting continental pieces collide and warp, the resultant wrinkles form mountains. This Himalayan massif is believed to be the result of such a collision between the Indian and Asian plates (geologically a comparatively recent phenomenon). Consequently, much of the high altitude Himalayan fauna is typical of both the Oriental and Palearctic regions.

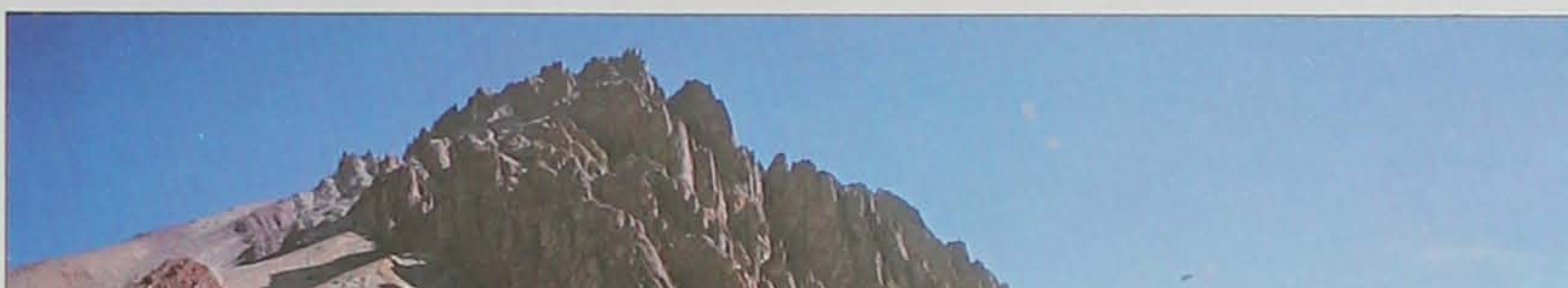
Ladakh's most striking feature is the nakedness of the country. Lying as it does to the north of the main Himalayan range, most of Ladakh falls in the Palearctic rather than the Oriental region. Ladakh possesses virtually no natural forests, though along river banks and valleys some greenery does exist. The lower mountain slopes are sparse but higher up, near the snow line, wild rose, willow and herbaceous plants have successfully colonised the slopes. This is the alpine zone. While soil, wind, precipitation and exposure are important determinants in the arrangement of specific life, the temperature differential due to altitude is by far the most important factor. Because of the decrease in temperature, vegetation becomes more sparse and stunted as one ascends the slopes.

In this extremely harsh environment the untrained eye would hardly see any evidence of wildlife at all. Animals which have adapted to the rigorous conditions however, thrive on the minimal vegetation, poor shelter, rocky terrain and bitter cold. Nevertheless, most creatures, notably the ungulates, do migrate to lower regions in winter while others, like the brown bear and marmots, choose to hibernate. Ironically, at this altitude many animals suffer from "mountain sickness" because of the lack of oxygen! Their bodies however, seem to adapt to this condition, as the number of red blood corpuscles increases along with blood acidity. Most large mammals have a unique device for protection against the cold—a highly insulated shaggy coat. They, therefore, have less need for shelter from the elements. This is perhaps why more species of goat and sheep live here in open country than anywhere else on earth.

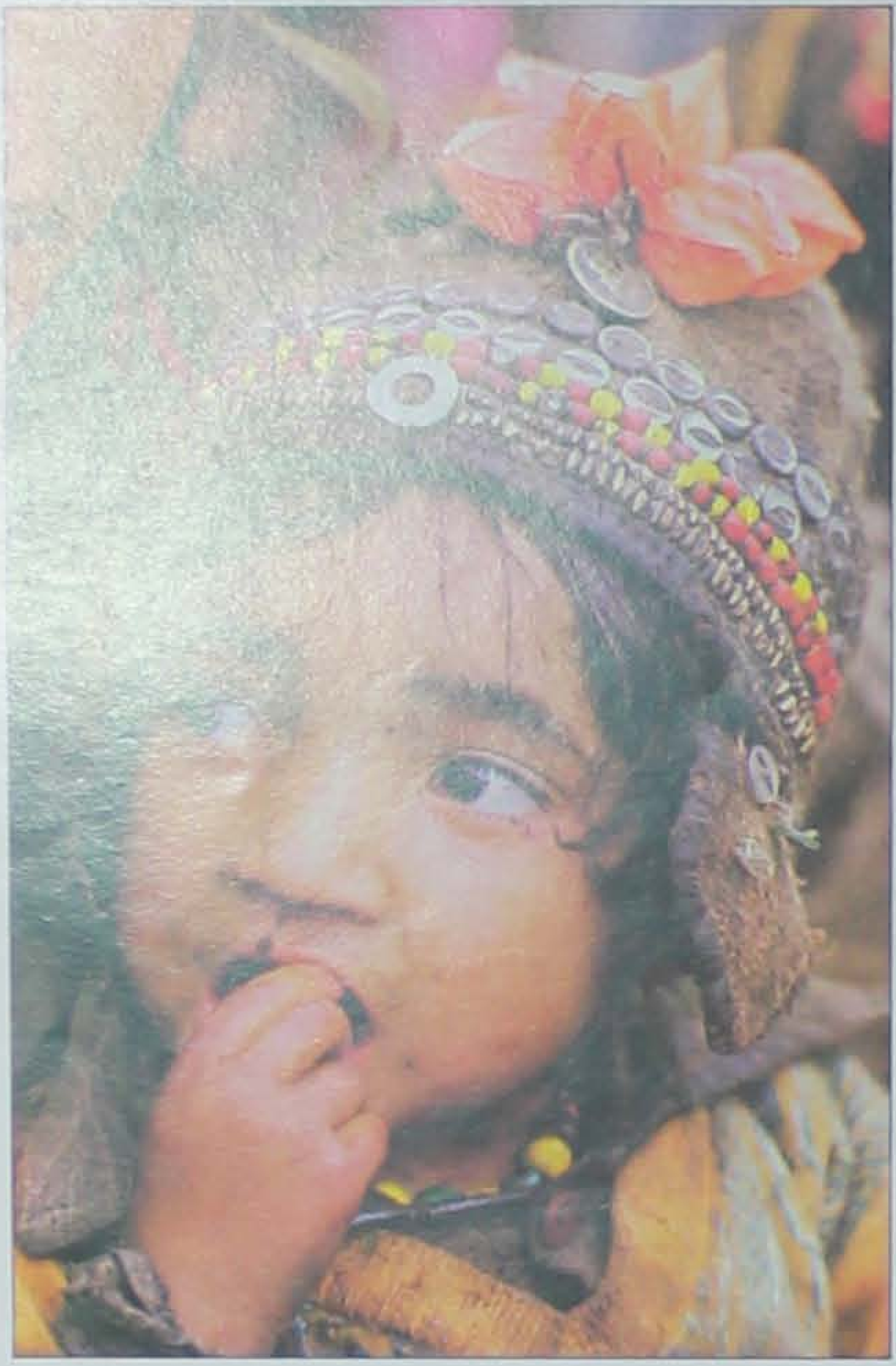
The largest animal of the cold desert is the yak (*dong*), a wild ox. First described only a century ago by the famous Russian naturalist-explorer, N.M. Przewalski, the wild yak is definitely more imposing than its placid domestic counterpart. Immensely shaggy and weighing about a tonne it has curved horns whose tips can be as wide apart as 90 cm. and measure 76 cm. over the curves. It can easily be distinguished by its long black hair which is tinged with grey at the muzzle. Spending its summers at a height above 6,000 metres, in winter it moves in herds to the lakes, marshes and lower valleys. After desperate attempts to search for wild yak in Ladakh I spotted only a small herd of 22 near the Chang Chenmo valley in 1983. While carrying out an operational recce a colleague, Major Jacob, suddenly spotted some yaks in Kurang Nala near Chang Chenmo. Thrilled with the discovery he radioed a message and I reached the site immediately. We observed the herd for a whole day. The numbers of these once common animals have been greatly reduced as have the numbers of the great sheep.

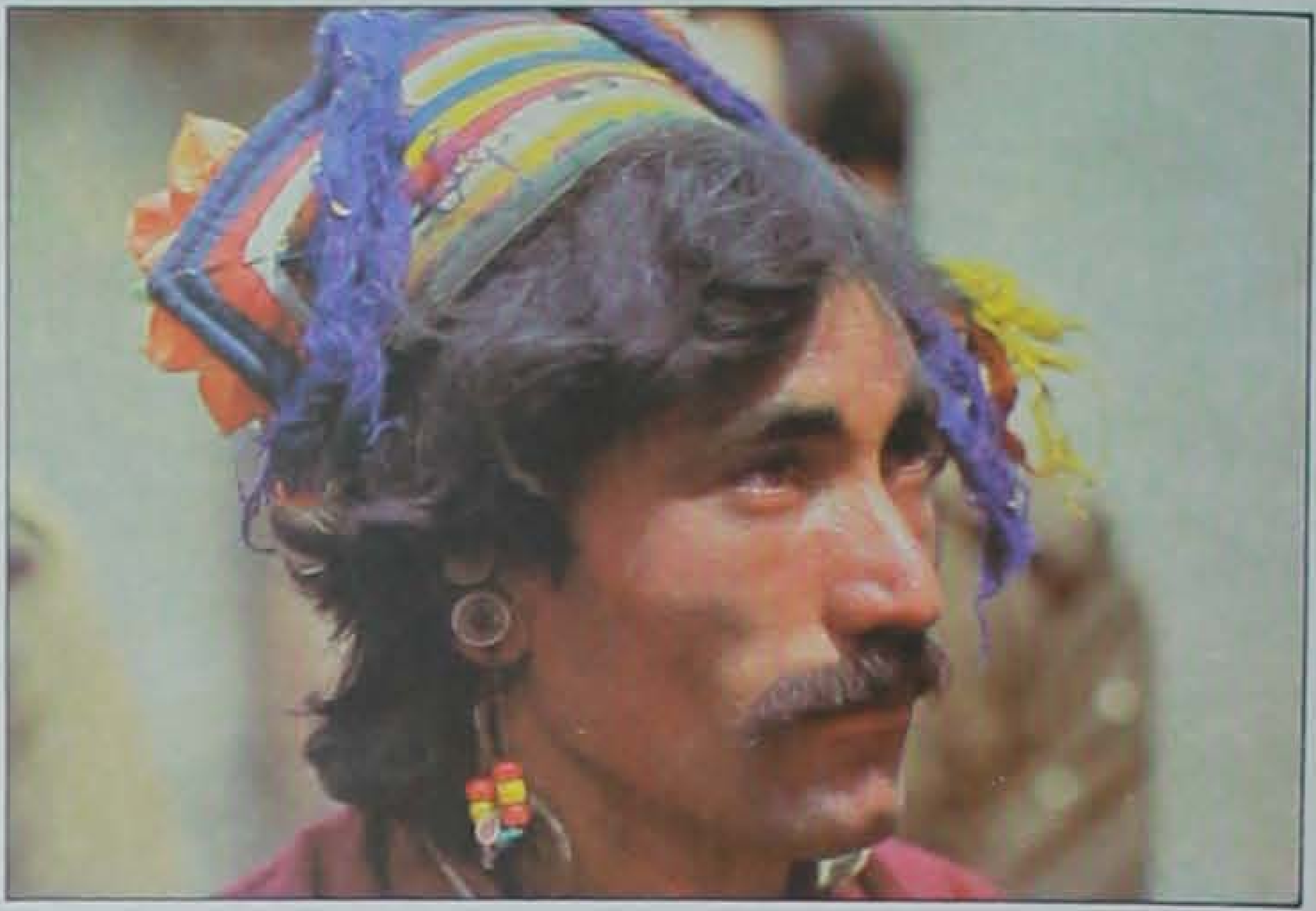
All the world's sheep are closely related and zoologists generally believe that each kind is only a variation of the same species. The largest and most magnificent of wild sheep is the nyan also called the Great Tibetan sheep (*Ovis ammon*). Roughly 200 of these antelope-like animals are found in the extreme eastern portion of Ladakh. The horns of the nyan measure upto 145 cm. and the animal





Ladakh's most striking features are its mountains ranges (**top**) which stretch from the south-east to the north-west and include the Greater Himalayan Range, the Zanskar Range, the Ladakh Range and the Karakoram Range. With the advent of summer (**above**), Ladakh's valleys undergo a miraculous transformation as life-sustaining vegetation including flowers of all descriptions, lend colour to an otherwise bleak landscape.











Despite extremes of climate and desolate wilderness, Ladakh manages to support the lifestyles of a hardy and spirited people. Ladakhis revere and respect Nature and do not trap or kill any animals for their livelihood, relying instead on hardy crops and domesticated livestock. Animism often plays an important part in their social and religious life.



Mongolian Plover *(Charadrius mongolus)*



Redshank *(Tringa totanus)*



Great Rosefinch *(Carpodacus rubicilla)*



Barheaded Geese*(Anser indicus)*



Horned Lark *(Eremophila alpestris)*



Black-necked grebe *(Podiceps nigricollis)*

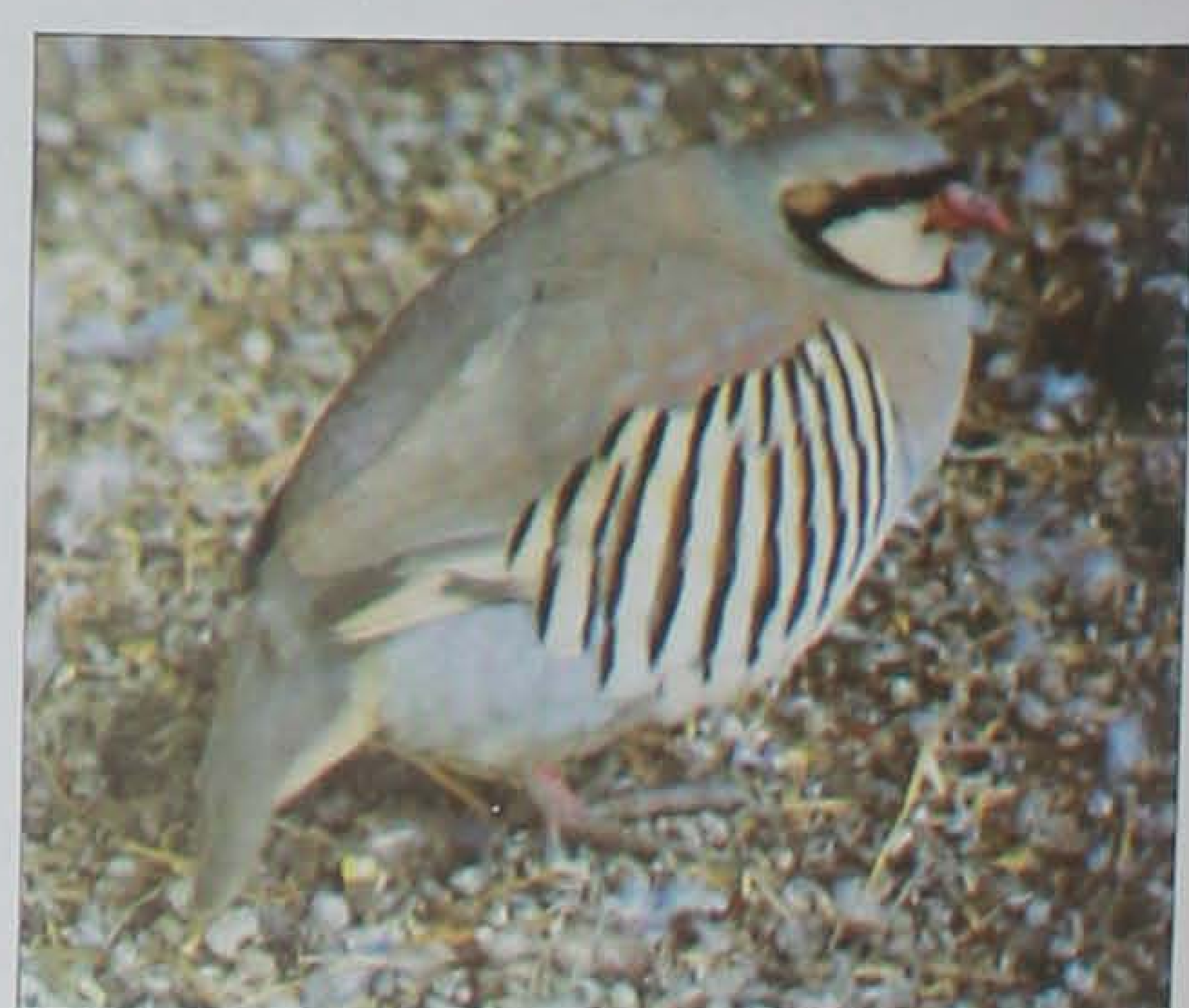

Snow Pigeon *(Columba leuconota)*


Snowcock *(Tetraogallus himalayensis)*


Tibetan Desert Wheatear *(Oenanthe deserti)*


Brahminy Duck *(Tadorna ferruginea)*


Brownheaded Gull *(Larus brunnicephalus)*


Chukor Partridge *(Alectoris chukar pallesens)*

normally remains at a great height, rarely descending to a level below 4,500 metres. Together with General Gaur, with whom I have shared endless naturalist-adventures, I once trekked to observe and photograph these sheep near Kakset La. We had no sooner started climbing to a pass, 4,800 metres high, when the weather turned foul and mist and snow engulfed us. Visibility dropped to 20 metres. It was cold and ice formed on our faces with each breath we took. Suddenly, while negotiating the steep slope we heard the noise of tumbling boulders and rocks barely a metre away—unmistakable evidence that a nyan herd was moving about above us. It was only an hour later when visibility improved and we had climbed another 300 metres that we actually saw the herd staring down at us from a height of over 200 metres. They were silhouetted against the skyline and our attempts to close in and photograph them proved futile.

The urial or shapu, (*Ovis orientalis*), which weighs 85 kg. and has horns measuring upto 99 cm., is the smallest of the wild sheep in eastern Asia, its body just about as tall as its horns. These sheep prefer the grassy mountain slopes, usually at a height of 3,000-4,000 metres. The mating of this species, as is the case with most sheep, takes place during December-January and they give birth to their young around May. The need for protection of the urial is great as they are within easy reach of hunters. Their numbers have been declining rapidly and I estimate there are no more than 500 in Ladakh, while a survey by the Wildlife Department of Jammu and Kashmir puts another population in the Markha and Rumbak valleys at only around 34-50. The most common and widespread of the sheep in the Ladakh region is the bharal or the blue sheep (*Pseudois nayaur*). Found at an altitude of almost 6,000 metres, in summer they graze in huge herds on the rich and abundant grasses of the alpine meadows. Their brownish-grey colouring provides them with protective camouflage and as they often stand motionless they can be extremely difficult to spot but, when alarmed, bharal will bolt swiftly to safety. Strangely, bharal seem to bear some morphological traits of both sheep and goats.

Of the goats in the region, ibex (*Capra ibex*) are the most distinctive and beautiful. Sporting a pair of fine, curved, spiral horns measuring as much as 147 cm. (the largest on record), the large stocky ibex normally move in herds of 10-16. They prefer the black precipitous rocks and cliffs and consequently roam much higher than the smaller wild goats, descending, however, in winter to lower altitudes to feed and shelter. The Wildlife Department of Jammu and Kashmir estimate that around 250 ibex exist in Kanji Nala.

Inhabiting the steppes of this Tibetan plateau are two small creatures not generally associated with high altitudes, the Tibetan gazelle (*Procapra picticaudata*) and the chiru (*Pantholops hodgsoni*). The former, sighted very rarely on the eastern fringe of Ladakh, sport horns measuring 36 cm. and are generally seen in herds of 5-10. The latter also called Tibetan antelopes, are strange little animals with beautiful horns measuring upto 69 cm. Chiru inhabit the Aksai Chin and Tibetan plateau, usually above 5,000 metres. In summer the herds migrate to the Dopsang Plains and Chang Chenmo valley. These delicate animals are often poached for their wool from which the famous *Shahtooshi* shawls are made. Also found in western Ladakh are the much persecuted musk deer and kiangs—the handsome, sleek, rust and white coloured wild asses, whose estimated population is around 1,500.

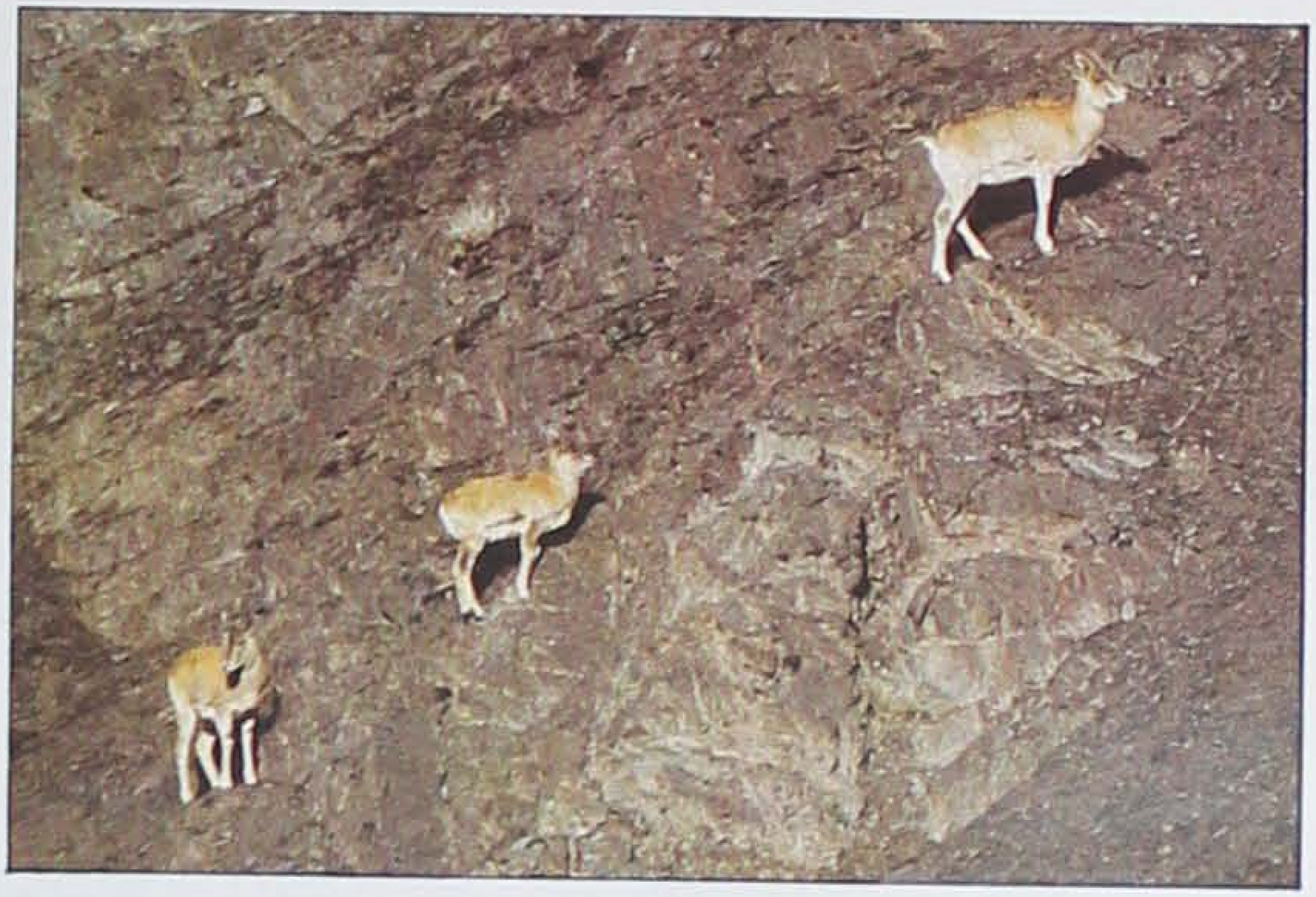
As is invariably the case everywhere, predators tend to be fewer, both in number as well as diversity, than their prey. This applies even more strongly to the alpine region where the availability of food is so greatly reduced. The snow leopard, or ounce, is truly a predator of the heights, living nowhere else at all. Perhaps the most magnificent animal of the mountains, it is cream coloured on the chest and underparts, with a thick coat of ghostly grey marked with black rings or rosettes. This colouring forms a perfect camouflage against rocks and snow and allows the carnivore to hunt by surprise. High in the mountains, this solitary animal hunts goat, ibex, blue sheep and shapu by following them up and down the slopes in their seasonal migration. During the winter, snow leopards stalk the lower mountains, often feeding on domestic stock. Observations seem to indicate that this animal hunts in the early mornings and late afternoons. Despite the heavy toll taken by poachers, the population of the snow leopard in Ladakh is estimated by me to be roughly 200. With





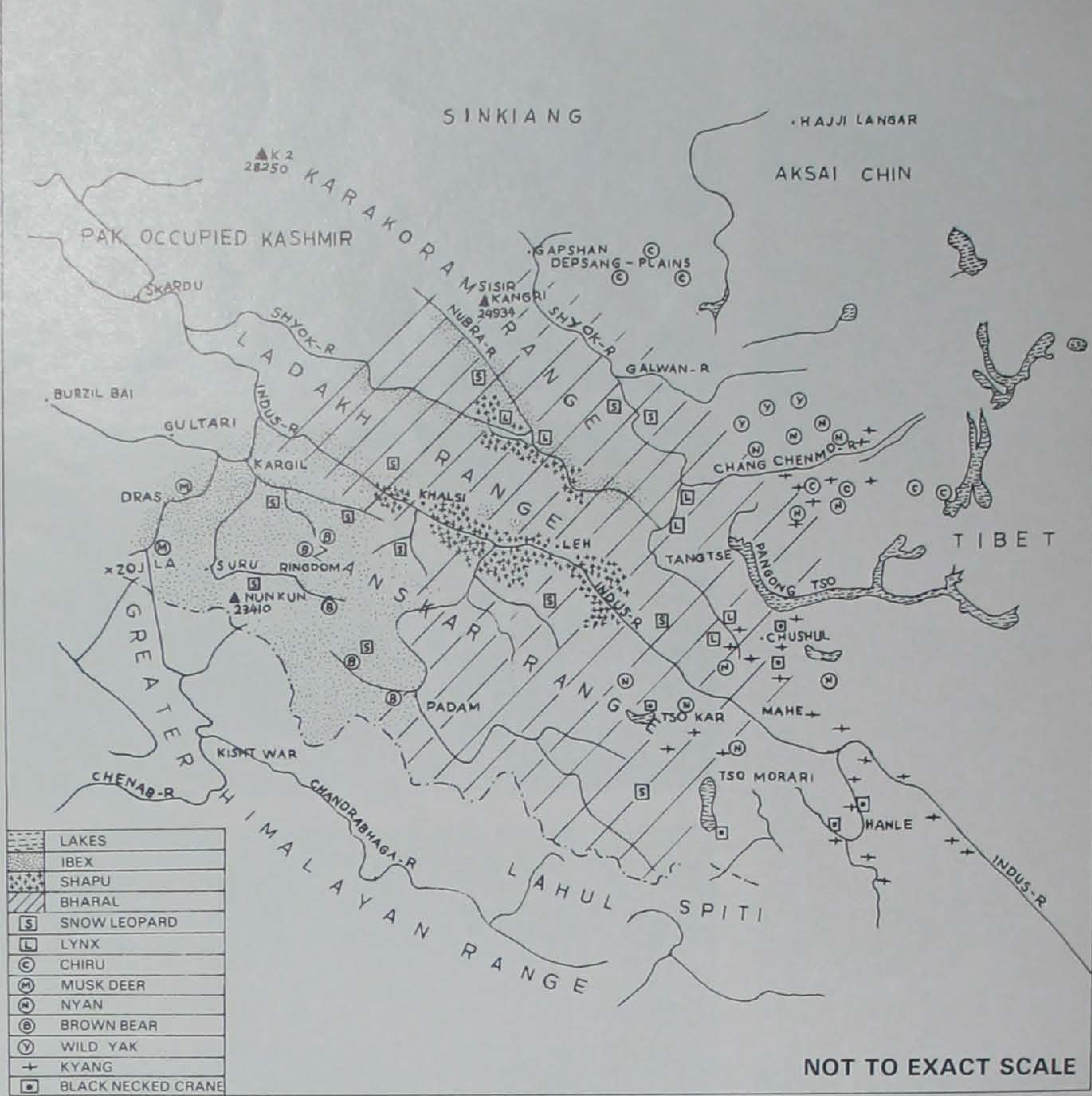






The red fox, or hill fox (*Vulpes vulpes montana*), (**left**) seen here in full winter colours, inhabits thorny brush-lands and willow growths close to Himalayan streams. A solitary nocturnal hunter, it predates on marmots (**top**), mouse hare (**middle**) and other rodents, as well as ground birds such as pheasants, partridges and snowcocks. Larger animals, like the wild sheep called shapu (*Ovis orientalis*) (**above**), are too large for this small canine carnivore to handle.

LADAKH—DISTRIBUTION OF MAMMALS



almost 40-50 skins smuggled out of Ladakh in the 1950s, 30-40 in the 1960s and 10-15 still being slipped out, the main enemy of this animal is, undoubtedly, man. Two other carnivores inhabiting this mountain home are the great bears. The medium-sized Himalayan black bear (*Selenarctos thibetanus*), a forest dweller, is found upto heights of 4,500 metres in the summer. Like most bears it feeds on practically anything ranging from fruit and ripe corn to sheep, goats, deer and even termites. Its usual home is in dug-out hollows or caves. Further up the mountain lives the more adaptive brown bear (*Ursus arctos*) which has a population of around 200 (of which approximately 20 are found in the Kargil area—the rest in the Zanskar valley). Three or four pairs of black bears have also been spotted here during the months of July and August when fruits like apricots and apples ripen.

The wolf population in Ladakh is likely to be around 300 and consists of two basic varieties. The northern race is light fawn and brown

whereas the southern is invariably darker. These wolves, probably the most hated predators in Ladakh, hunt in pairs and move over vast territories. I observed one particular pair regularly moving across a narrow valley at dusk. A week after I last spotted them they killed a pony very near the area in which I had seen them. The red fox exists in larger numbers but many are, unfortunately, trapped for fur. From western Ladakh alone, about 400 skins are possibly smuggled out every year. The stone marten, a pretty, alert and active animal is also hunted for its fur; again about 400 skins are smuggled out annually.

Also found in the remote region at a height of 4,400 metres is an attractive isabelline cat, the lynx or *eeh* as it is locally called. Lynx are fawn and white in the winter and slightly darker in summer. They may sometimes be mistaken for wolves as their ear tufts stand out prominently. The tail is short and dark. Marmots, snowcocks and hare constitute the lynx's normal diet.

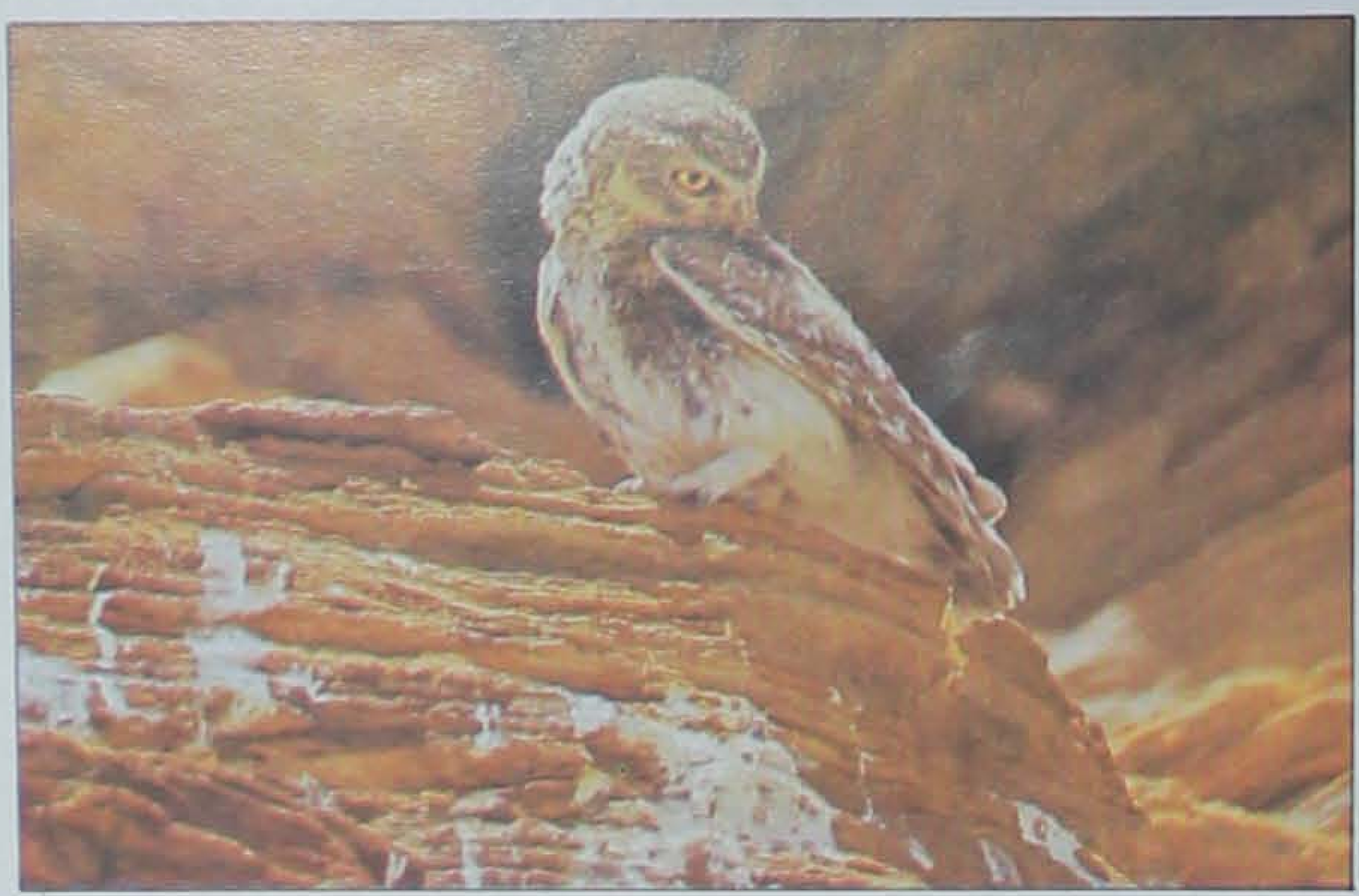
During the past year, I had occasion to see a lynx twice at close range. While trekking up to one of the defensive positions in winter I suddenly saw a shadow flit across my vision from behind a massive rock, and ahead of it I saw a herd of local domestic sheep and goats tumble down the mountain slope like a torrent. I got a better look soon after, at a distance of around 30 metres, as the animal moved steathily away, every now and then turning back to look at me. During the summer I encountered one moving across a valley just before dusk. On spotting it about 200 metres away I sped after it in my vehicle and easily reached within 50 metres of the animal. The lynx bolted, turned to look in my direction once and then trotted uphill, startling some Tibetan hares in the process leading them to jump for cover.

Apart from the wild animals, almost 169 varieties of birds have been identified in Ladakh. These birds too, like the animals, make the best use of whatever shelter they can find. However, because of Ladakh's inhospitable climate, very few are permanent residents. The Himalayan and Tibetan snowcocks—large majestic birds much hunted for their meat, and partridges breed at a height above 5,000 metres. The rest are visitors, moving down to the foothills and plains in autumn in an annual ritual of altitudinal migration. Other birds move still further, horizontally following ancient routes of global migration.

An overview

Comprising two districts, Kargil in the west and Leh in the east, Ladakh, inhabited by an estimated 1.5 lakh people, is one of the most elevated populated regions on earth. It is situated at an altitude between 2,900 metres and 5,900 metres and lies between 32-36N and 76-79E. In winter temperatures drop to as low as -40°C, while in summer they may rise to +37°C. In addition to seasonal variations, the climate at this height shows a great diurnal difference, with regions above the tree-line experiencing warm days and sub-zero nights. Rainfall is minimal (92 mm.) since Ladakh is situated in the rain shadow of the Himalayas. Most of the water available is in the form of frozen snow and ice and Ladakh is even now as Kha-pa-chan (Abounding in snow). The great river Indus flows from Mount Kailash over the flat Tibetan plateau, through narrow gorges, finally entering the Karakorum range. The Tibetans believe that this river originates from the mouth of a lion and is therefore called Singh Chu (lion river). Singh Chu has gradually been distorted to Sindu, Indus and finally India. Other rivers like Nubru, Shyok, Dras, Suru and Zanskar, originating from northern glaciers, join up with the Indus. Water streams form immense brackish lakes of which Pangong—Tso (lake of extreme concavity), Tso Morari, Tso Kar and Tso Rul are some.









Seen here galloping at full speed across Ladakh's hard plateau land, kiangs (*Equus hemionus kiang*) (**right**), are considered by some naturalists to be related to the wild asses that reside in the Rann of Kutch. Thanks to the availability of transport and equipment (**top**), the authors had access to habitats which naturalists would normally find difficult to cover. Owls (**middle**) and kestrels (**above**) are just two out of the galaxy of birds of prey found in Ladakh.


General R.K. Gaur

The highest realm belongs to the birds of prey and carrion eaters. These include choughs, griffon vultures, ravens and lammergeiers (bearded vultures), which follow man and animal wherever they roam. Choughs and ravens have been seen as high as 6,150 metres along with the lammergeiers, which have a spectacular three metre wingspan which enables them to glide on high powerful upcurrents. Lammergeiers are never found far from mountains and locals awed by their size falsely believe them to be capable of carrying away young lambs.

Just before the snowline in the alpine pastures insects are numerous and a large number of seasonal birds can regularly be seen feasting on this abundant food source. The barheaded goose breeds in Ladakh in large numbers. In fact, the largest breeding colony within Indian limits exists on the north and south banks of the Tso Morari lake. Ladakh is one of the few places where the Mongolian plover can be seen. It nests and brings up its young in the month of July. This bird's 'distraction display' is a fascinating event to watch. The male pretends to be wounded and, wings dangling, drags himself along the ground to draw the predator's attention. Meanwhile, the female plover quickly guides its young away from danger. Several other birds like the Tibetan sandgrouse—a beautiful fawn and cream-coloured bird, the Siberian ruby throat or *ogla mambar,* meaning throat in flames, the brownheaded gull which is one of the earliest of the summer visitors, wall creepers, wheelers and red starts also visit Ladakh in great flocks. By far the most majestic, as also the most endangered species in Ladakh, is the black-necked crane—a large handsome bird with a black neck and patch of red on its beak. I have observed that five to six pairs nest every year in Ladakh with a few loners in tow, thus placing the population at roughly 15. They arrive in the second half of April or early May and build their nests in the middle of the marshes. After approximately three weeks they lay two eggs within an interval of 12-24 hours. Both eggs are incubated after 18-24 days. Invariably, however, one chick dies. By late October or early November the cranes, with their surviving chicks, migrate to eastern Tibet or south China. During certain years, however, when the snowfall is light, the marshes remain dry and food for the cranes becomes inadequate. They then lay their eggs in dry areas which are easily approached by predators. The need for a water-management plan for preferred nesting areas is acute. Meanwhile the army has been posting guards near these nesting sites to ensure that the eggs are not carried away by predators or egg collectors who lift the eggs to sell them to tourists! Once the chicks grow large enough to fend for themselves, the guards are pulled back.

This deceptively calm Arctic desert is a world apart. Here breed some of the most resilient and beautiful species known to mankind. The stupendous, jagged mountains, glacier-born torrents, cruel cliffs and the vast wilderness of rock and sand inspired awe in the hearts of man and gave rise to the *Bon* religion which was based on a reverence for nature. Ladakh was once the home of animism, and trances, demons and spirits, some of the ancient rituals of the *Bon* religion, have actually been incorporated into the Buddhism being practised locally today.

Ladakhis do not kill or trap any animal or bird for their livelihood. The killing of animals has, however, always been synonymous with courage and bravery within the armed forces. Because of the possession of weapons the army had developed an ethos whereby 'shikar' attained a great status and became a gauge of physical prowess. I distinctly remember the tremendous thrill with which we all once spoke of weapons and the killing of animals and birds in Officers' messes which would invariably be adorned with trophies collected over the years. We were young officers then. Even today, in some quarters, this code persists with occasional hunting sprees taking place, despite the fact that rules forbid hunting almost everywhere. Negative rules, however, are not sufficient to build up a respect for Nature. I strongly feel that the rank and file in the army need to be educated on the value of conservation and preservation, to which little thought has been given so far. The soldier's life has, from time immemorial, been intimately woven with Nature. No human being spends as much time in remote and ecologically rich areas as he does. He therefore, finds it easy to fall in with the rhythm of nature and be part of it. An active involvement of the Defence Forces (particularly those on the frontiers) in the programme for conservation, is essential. In order to make the best use of the capabilities

of the Defence Forces, however, certain steps need to be taken. A cell needs to be set up, for instance, at the Ministry of Defence to coordinate the conservation programmes of the three services. Voluntary conservation bodies should provide specialised equipment (cameras and telescopes) and education programmes aimed at making recruits aware of the importance of ecology. This can best be done by making the subject compulsory in the training schools showing films on wildlife to the men and making available books and magazines on the subject. Army personnel must be involved in ecological studies. Legal authority given to military commanders in remote areas would effectively reduce the incidence of poaching. For such objectives nobody is better equipped than the men of the armed forces. Deployed all along our frontiers, troops can provide excellent watch over the land, observing bird and animal behaviour throughout the course of the year. Facilities like binoculars, transport and radio sets are already close at hand and qualify the armed forces to become part of an extremely efficient, organised machinery to collect, collate and disseminate information on ecology. If this plan fructifies, the soldier who is today considered a threat to wildlife could actually become an excellent vehicle for the propagation of conservation and also become directly involved in specific programmes both during active service as well as after.

The whole field of studying and conserving life at high attitudes has been largely neglected. Though the Bombay Natural History Society team has studied the black-necked crane, University of Southampton teams have collated information on the birds of Ladakh, Mr. David Mallon has studied the Ladakh urial and a team under Prof. Kachroo has studied the flowers of Ladakh, government restrictions have prevented the teams from visiting *all* the areas. None have stayed at Ladakh for even one full year to observe the various aspects of their field. It is suggested that still more scientific teams should be encouraged, not just to study the flora and fauna of the area themselves but also to train army personnel. Such projects should be funded by organisations like the BNHS and WWF and the IUCN whose funds would go much further than normal with even minimal utilisation of army infrastructure. Measures to preserve and observe species like the nyan,



Chough

yak, chiru, Tibetan gazelle and black-necked crane should be taken by the Government of India, in collaboration with Tibetan authorities. A captive breeding centre for the black-necked crane at Leh, as well as high altitude National Parks and sanctuaries in Ladakh are long overdue. The Jammu and Kashmir government has, in fact, issued an order in 1982 that several areas in Ladakh be developed as sanctuaries, but none of the identified areas bear much evidence of progress. No forest guards have been posted, no pastures developed or salt lakes placed.

If no concerted action is taken soon I fear that the beautiful wildlife of the mountains may well disappear behind the snow and mist the way the snow leopard did when I last saw him, sitting on a cliff across a deep ravine. It was dusk and the last rays of sun lit the mountain tops. Through the mist and tiny snowflakes I could see the grace and gentleness of the animal whose fur, too, had caught the departing pink sunglow. I gazed at it admiringly till in the drifting snow it silently vanished never to reappear. □

The black-necked crane

by S.A. Hussain



General R.K. Gaur

Prior to the advent of winter when the marshes begin to dry, the black-necked cranes *(Grus nigricollis)* **(above)** congregate in preparation for their sojourn to their wintering quarters. Legs and feet stretched out behind, and neck held straight in front, the effortless flight of the black-necked crane **(facing page)** is extremely beautiful to behold.


S. A. Hussain

It snowed suddenly on the night of July 23, 1983. There had been no sign of any change in the weather earlier in the evening as we strolled past the poplar groves on the outskirts of Leh. Gen. Gaur, a teetotaller and a vegetarian officer, (a rare phenomenon in the army), his Nikon slung around his lean, yet erect body, with a golf cap perched rakishly on his head and Col. Hamid Ali, an equally sedate and kindly doctor of the division, had both promised me a spectacular moon-rise over Leh. Our pace quickened as the needle-sharp shadows of the poplars lengthened across the road. The moon, when it did rise, over the jagged, bare hillside, to cast an icy light over the crystal-clear night, bathing distant snow-peaks with a mysterious glow, was breathtaking. Later, much later in the night, tiny snow crystals gently settled on the tin roofs of the barracks, on bare willow branches, sand channel fences and even on the rubble stones, giving them an appearance of so many white-turbaned human heads. Soon every inch was clothed in soft, white snow. It had snowed in the middle of summer! Little children, swaddled in their winter clothes, apple-red cheeks glowing, trotted by to their school perched atop a hillock. Men and women everywhere were shovelling snow off their rooftops to ease the weight on their frail houses, and down in the lanes of the town, soft virgin snow soon gave way to a maze of slushy footprints, evidence of people having begun their various jobs for the morning. By noon, the sun had melted most of the snow, except in a few stubborn shadows and crevices. That morning I met Deshpal, the retired forest ranger. He was ambling past the rows of traders' shops which had witnessed the passage of caravans, coming up from the lower reaches of the Himalayas on their way to distant Yarkhand on the old silk and gold route, in a bygone era. Deshpal's weather-beaten Mongolian features cracked into a broad, friendly smile as he greeted me as he would a long-lost friend. Eight years ago we had spent days huddled together in cold tents, plodding through bleak, windswept mountain sides and boggy marshes in search of the 'Tung Tung', the sacred black-necked crane. His knowledge of the wildlife of Ladakh, I had discovered long ago, was phenomenal.

Of the 15 crane species in the world the black-necked crane *(Grus nigricollis)* is perhaps the only one that has eluded the scrutiny of both professional biologist and amateur naturalist. Till today, therefore, it retains an aura of mystery. Discovered relatively recently in 1876, by the Russian naturalist/explorer, Count Prezhwalski, this bird has an exclusive distributional breeding range between the altitudes of 3,500 metres to 5,500 metres in the tablelands of Central Asia. Its migratory patterns are equally unique. Cranes have been recorded from eastern Ladakh, southern Tibet, Bhutan, Arunachal Pradesh to Szechwan, Yunan and Vietnam. A review of available data suggests that there are two distinct populations polarized on either extreme of the Tibetan tableland and a winter dispersal pattern that looks like a crescent on a map. The eastern population, which moves along a north-south course, has a clear-cut breeding area in the high altitudes and a wintering area of at least 1,000 km., in the lowlands of Vietnam. In contrast, the western population is rather confusing. Breeding and passage areas seem to overlap along a crescent shaped tangent from Ladakh to the lower hills of north-eastern India. Our knowledge of birds in these areas, however, is rather scanty and judging from the records available, it is assumed that somewhere beyond the bamboo curtain, safe from international intrigue, the cranes are fairly plentiful! Recent information which surfaced during the International Ornithological Congress in Moscow, in August 1982, is comforting and suggests that the actual situation may not be as alarming as it is generally assumed to be.

"You have come for the 'Tung Tung' again, my friend," Deshpal observed, after a while, as we sipped steaming 'gud gud'—salted tea topped with yak butter, "They always keep coming back to Chushul, Hanlé and Tsokar, they build their nests and lay their eggs there but nobody knows what happens to them afterwards." "Have you had any recent news of the 'Tung Tung'?" I asked. He replied, "I am getting on in years and hardly ever go out into the wilderness. But I do hear about 'Tung Tung' now and then. Two years ago, young Norbu went out with your colleague Gole Saheb, to find that the Chushul birds had lost their eggs in the floods and the Hanlé pair had shifted to a nearby marsh. The number of people, cattle, sheep and houses have all increased and there is hardly any place left in those marshes for the birds. Where can the 'Tung Tung' go?" he

asked, shaking his head sadly.

"What about the army?" I prodded. "They were everywhere in the beginning but now they are careful. The top officers are aware of wildlife and take care to see that no harm comes to the birds. Go to Chushul," he said, finishing off his tea with one gulp. "Look around all the marshes, 'Tung Tung' are bound to be there but take a *goncha* (traditional Ladakhi attire) with you." I just knew that the 'Tung Tung', would be there, beyond the formidable Changla Pass, claimed to be the highest road in the world.

Biologically, everything about the crane group, *Gruidae,* seems to indicate that the birds are of very old origin having appeared on earth some 60 million years before man. Now, probably, they are on their way out. They are not found in abundance anywhere except in several Buddhist countries like Japan and Korea, where they receive socio-religious protection. Small groups of cranes do exist elsewhere in Asia, Europe, Africa, North America and Australia, but nowhere in South America, the Malayan archipelago, Pacific Islands or New Zealand. Most species of cranes are migratory and some of them travel awesome distances each year. As for the black-necked crane, it chooses to migrate to higher altitudes to nest.

Large and stately, the inhabitants of open marshlands, wet plains, prairies and occasionally sandy flats, the 15 species of cranes stand two to five feet tall with a normal wing-spread of seven to eight feet. Most cranes have grey, white, brown or blue plumages with black primaries, and long inner secondaries that hang over the tail. The black-necked crane has a very pale grey, almost white, body with a black neck, head, feet and well-developed secondaries. Its bill is greenish. All cranes have long legs, long straight bills and necks and an elevated hind toe which normally bears none of the bird's weight when it walks. They fly with their heads and necks straight out, their legs and feet stretched out behind and with a regular, steady and slow downward wing beat matched by a rapid upstroke. They may circle at tremendous heights (sometimes five km. above the ground) to form long V-s—an extremely beautiful sight. Cranes seldom glide, except when preparing to land. A distinctive feature about this bird is its windpipe which is shaped differently in each species but is always elaborately coiled, somewhat like a trumpet. This permits the bird to produce a sound very much like that of a trumpet—a loud, resonant, far-reaching cry which can sometimes be heard miles away. To this clarion call they may occasionally add, when on the ground, a series of softer notes to produce a pleasant musical sound.

A crane eats a great variety and quantity of animal and vegetable matter. Gram, berries, small fruits, tender roots, insects, insect larvae, worms and snails constitute its diet. This the crane supplements with small amphibians, reptiles, birds and mammals but very few fish. Astonishingly, during summer, sandhill cranes have been known to consume 400-500 grasshoppers, crickets and earthworms a day, while one whooping crane is even recorded to have eaten 800 grasshoppers in 75 minutes! In winter some cranes may fly as far as 19 km. a day from roost-ponds to grain fields to feed, probing and digging their bills into the soft ground, in search of succulent roots and grubs. They drink by dipping their bills into the water, upto their nostrils, then raising their heads and swallowing quickly.

Spectacular dancing ceremonies, considered graceful by some and ungainly by others, are renowned amongst the crane family. The dance involves a stiff walk around one another in quick mincing steps, with wings half-spread and legs held gracefully below them, followed by leaps and bounds about two to three metres high into the air to the accompaniment of loud calls. This behaviour, seen in both sexes, is most often displayed before the breeding season and sometimes whole flocks of cranes can be observed taking part. At other times a lone crane or even pairs perform, bowing deeply and stretching sideways. Bits of grass or sticks are picked up in their beaks, thrown up into the air, to be jabbed at as they come down. Joining in the show, as actively as the adults, are the baby cranes! No definite explanation for this behaviour, which goes on throughout the year, is available although it is assumed that the crane may be using this ritual as a means of releasing extra energy or emotion. With its nest or young nearby, the crane may well use similar tactics to distract probable predators. Many species of cranes give 'unison calls' during the early morning, mid-day or occasional-



S.A. Hussain

Black-necked cranes normally lay two dull-white or brown eggs. According to the author, the black-necked crane is not so precipitously poised on the brink of extinction as to justify the collection of eggs from nests in Ladakh's marshes for the purpose of captive breeding by the International Crane Foundation in America. More advisable would be the setting up of a captive breeding or captive rearing unit in Ladakh.

ly when they are about to change incubation duties. With their necks and heads extended upwards and wings held tight against the sides, both birds utter a series of bugle calls so well synchronised that the ensuing sound seems to be a single call from a single bird.

The plateau of Ladakh, the home of the black-necked crane, nestles at an average altitude of 3,657 metres to 4,570 metres. This jagged, treeless 'Martian' landscape is very low in oxygen and, apart from the sturdy native Ladakhis, any lowland inhabitant coming up has to undergo gradual acclimatisation before venturing out. Leh, with its well-equipped military hospital, is fairly comfortable for the casual visitor but those venturing further out are at the mercy of the harsh elements. When we arrived at Leh, the willows and poplars had just put out the new leaves of spring. Barley fields were being ploughed in preparation for the coming summer—a season of productivity, colour and festivity. After a week's acclimatisation we set out on the first leg of our journey towards Chushul. The road to Chushul, if it can be called one, is an experience not to be forgotten. A bend in the dusty track revealed to us the picture of a deceptively calm Pangong lake stretching like an enormous indigo fabric laid out to dry in the sun. Shaped like a giant boomerang, Pangong nestles between two mountain ranges. A number of glacial streams feed it, but due to a high rate of evaporation, the water itself is brackish and virtually bereft of living organisms. Our rather bumpy two-hour drive along the lakeside was an unforgettable experience. We wondered at how the colour of the water changed from indigo-blue, light ermine, emerald green and eventually to an almost undefinable combination of all colours depending on the angle of sight, the position of the sun and the reflection of the surrounding mountains. As the wind rose, towards mid-day, the lake's glassy calm broke into a million tiny wavelets until finally it was transformed into a crescendo of foamy waves crashing onto the colourful shingled beach.

A track branches off at the heel of the lake to ascend a rocky, sandy hump and as we descend the hump we are afforded our first view of the Chushul valley. Once the amphitheatre of the 1962 war with China, the valley now

nestles peacefully among grassy meadows and glacial streams. A few twisted, mangled remains of war machines lie strewn around on the abandoned airstrip. A war memorial bears mute testimony to our brave heroes and as one's gaze moves over the snow-capped peaks one cannot help but feel the presence of the invisible souls that once fought and died here. We decided to explore the bog situated north of the village soon after our arrival, a place where Prakash Gole (1980) had earlier seen a crane's nest. We drove past endless sand-dunes, one giving rise to another, until suddenly we came upon a small bog fed by a narrow glacial stream. At first, apart from a number of grazing ponies and a couple of shepherds' tents, there was no sign of the cranes. We were rather dismayed. The pair, we discovered later was, however, very much there, hiding behind the far dunes as they anxiously eyed us hovering around their nesting domain. Though we did not manage to locate the nest or the eggs, judging from the behaviour of the pair, we were certain it was nearby.

We returned early the next morning when the sun had just begun to rise, bathing everything in its dazzling brilliance. The marsh was alive with russet-coloured Mongolian plovers, darting, yellow wagtails, musical redshanks in their summer attire and hordes of short-toed larks. Ponies, yaks and sheep, their bells tinkling discordantly, gingerly stepped around slippery mounds to get at the tender marsh grass while Ladakhi shepherds sprawled comfortably over the sand-dunes. Once again the pair of cranes sensed my presence and quickly vanished over the dunes. *This* time I was prepared for them. A dull-red, *goncha,* thoughtfully recommended by friend Deshpal back in Leh, was securely wrapped around my body, held up by an outrageously brilliant red silk waist-band and a matching woollen cap. Hunching my almost six-foot frame to look every inch like a five-foot Ladakhi, I sat down on the edge of the bog, ignoring the prickly marsh grass, hoping that the cranes would not mind my non-Ladakhi beard. I prepared to settle down to learn the art of crane-watching.

I had been sitting for nearly an hour. The ever-curious ponies and yaks had long since given me up for another lazy Ladakhi basking in the sun, while wagtails and plovers contemptuously stepped around me in search of insects. The smaller of the two cranes was



Cranes are extremely protective parents. When faced with a threat to their young ones, they will engage in a spectacular distraction display aimed at drawing the probable predator away from their young.

the first to arrive (I subsequently learnt it was the female). She gingerly stepped down to the edge of the marsh, darting that suspicious one-eyed glance (that only a crane could effect) towards me. She stood there for quite some time, diligently examining every bit of grass and mound, occasionally throwing up her slender neck to look around the bog but pointedly ignoring me all along. Through the corner of my eye I watched her protracted movements towards the centre of the bog as I furiously took down her behaviour patterns in my field notebook. Eventually she approached her nest site to settle on her eggs, teaching me my first lesson in crane-watching. Do anything you want except look at the object of your interest! During the 45 minutes the crane took to reach her nest, I had tied my shoelaces, dug a small pit with my fingers, fiddled with my telescope, cleaned my camera lenses, watched the flying birds, studied the surrounding snow line, crawled up to my back pack a few feet away to fetch a *chapatti* and, on the whole, pretended to be interested in everything but the crane. Once she had sat on her nest which was about 150 metres from me, I knew I had been accepted. Thereafter, I was able to walk along the edge of the bog, while she ignored me giving me only a couple of idle glances now and then. I had noticed that the bog had begun to dry up on one side and if one did not mind a wet bottom, one could crab-walk (try it with cameras, lenses, tripod and a telescope dangling from your neck and shoulders in 60 per cent oxygen!) up to about nine metres from the incubating crane. By noon I had managed to crawl up to the last big mound between myself and the nest. Resting the camera on the mound and lying flat on my belly, I tried to catch my breath, while she watched what must have appeared to her like a human head with a strange big eye peering over a mound! Neither the sound of my autowinder nor the whirr of my 16 mm. camera disturbed her. I changed lenses, cursed my clumsy movements, dropped the lens, cursed louder and thought I was being extremely noisy but the crane continued to incubate. Presently she tucked her head under one wing and appeared to go to sleep. Her mate soon arrived to preen himself a few feet from the incubating female, characteristically ignoring my presence. Lying there, alternatively shivering in the afternoon breeze and being comforted by the warm sun, I photographed, filmed and recorded in my notebook the behaviour pattern of these two cranes at close quarters.

Later in the evening as I returned past the dunes on my way home, cold, weary yet exhilarated at having collected a great deal of data and some excellent photographs, I could not help but admire the courage and perseverence of the cranes who had to struggle for survival against awesome odds at every step.

All ground-nesting birds are wary of terrestrial predators and the black-necked crane, standing a clear four feet above the ground is particularly conspicuous in its nesting marsh. Since the nest, a large pad of dead aquatic vegetation, is positioned in an open meadow the only factor that keeps predators away are the extremely treacherous slimy, borax-topped mounds dotting the bog, on which these nests are constructed.

A number of other problems, both natural and man-made face the cranes of Ladakh. High altitude wetland systems, especially those of eastern Ladakh, depend heavily on water derived from the melting snows, since the rainfall in this region is virtually non-existent. Eco-systems, here, are therefore completely dependent on the prevailing climatic conditions, and a late summer would result in a delay in the ecological process very necessary for the regeneration of the life forms in the area. For the cranes this means, apart from the unavailability of marshland food, the absence of boggy marshes, which deprives them of safe nesting sites. The Chushul pair I was watching, were faced with precisely this problem of weather fluctuation, which had jeopardised the water regime of the marsh. When the pair arrived there, the marsh had received just enough snow-melt to provide the birds with minimum nesting conditions, adequate food and a promising bog to nest in. At this critical moment, however, when the birds were incubating and required the maximum safety, the water inflow stopped as a result of a drop in temperature, and the marsh began to dry up rapidly. The crane eggs, now so vulnerable to predators, were destroyed. A reverse of this phenomenon is equally unwelcome as excessive radiation during the early summer gives rise to floods in the marshes. Earlier, the Chushul pair had lost their eggs in such floods.

Cranes, wherever they occur, have seldom failed to attract man's attention with their grace, stature and unique courtship

displays. Poems and folktales have been composed on this 'symbol of luck and prosperity' and the Buddhists even place a special reverence on these spectacular long-legged birds. It is, therefore, not at all surprising that cranes, which build their nests on open grounds, were once not merely left unharmed by man but actually welcomed as harbingers of good luck.

This attitude towards the crane, however, is now undergoing a rapid change as are man's social, political and economic conditions. To improve the lot of the people living in the remote areas of Ladakh, stress has been laid on animal husbandry, since agriculture has very limited scope. And, unfortunately, in their zeal to increase the sheer numbers of their livestock, no serious thought has been given to the life-support systems available for the livestock. This has resulted in a severe strain on the existing pasture lands.

An increase in the number of people and livestock and the resulting competition for space has had an adverse effect on the breeding of cranes in these marshlands. Shepherd dogs pose a threat to the young cranes, as do other predators like the raven, the fox and the wolf that follow the nomadic shepherds of the region. Another development, detrimental to the crane, is the reclamation of areas, which affects them both in terms of dwindling habitat and access to watercourses. The trend, recently observed in Ladakh, has been to alter the waterflow system into the marshes—in some cases completely diverting the waterflow—so as to reclaim land for housing, agriculture and pasture. The Hanlé marsh is one such example.

For these various problems I would recommend the following solutions with an emphasis on speedy action from the concerned authorities:

1. Absolute protection should be accorded to all recognised traditional nesting sites especially during the breeding season. A minimum area around the nest-site should be cordoned off and all activity, within a perimeter of at least one kilometre from the site, prohibited. No habitation, permanent or temporary, should be allowed in the nesting marsh and, if necessary, a low fence should be erected around it to keep out livestock, dogs, etc.
2. Proper management of the waterflow systems leading to the nesting marsh is essential. The waterflow should be monitored so as to keep the amount of water constant. A drainage system to draw out excess water, and an artificial feeder in case of a decrease in the water supply to the marsh is imperative.
3. I also feel a special task force of the Department of Wildlife, drawn both from the state and the centre, should be stationed at all known nesting areas, to monitor and protect the breeding cranes and their chicks. The task force consisting of a field researcher should remain at the site from the beginning of May right through to the end of October.

In 1983, the International Crane Workshop held in Bharatpur emphasised the need for the captive breeding of the black-necked crane. A rather dismal picture was drawn up by the Indian delegates regarding the birds' status in Ladakh, even though, according to one delegate, 17 cranes had visited the area in 1981. The Chinese, speaking of their studies on ten nesting pairs in the Tsinghai province, reported a sighting of flocks of black-necked cranes on passage, at different parts of the central Asian tableland. It seemed apparent that the eastern Tibet population was far better off than their Ladakhi counterparts. Meanwhile, a report of the Crane Workshop Group of the XVIII World Conference of the International Council for Bird Preservation (ICBP) held in August 1982, at Cambridge, England, quotes, (as does the Institute of Zoology, China) a finding of 140 wintering cranes in the western Quizon province near Yunan. This report also mentioned 12 captive cranes and the setting up of a research centre near Xining in the Tsinghai province. Large migrating flocks of 300-400 black-necked cranes in the Tangra Range, along with another 600 in the Tsaidan Basin were identified at the XVIII International Congress at Moscow in 1982 by Ma Yi-Ching, from which we can conclude that news from across the bamboo curtain is certainly encouraging.

Black-necked crane eggs hatch into beautiful tawny-brown or grey chicks (**overleaf**), so precocious that they are able to swim and walk when they are only a few hours old!


General R.K. Gau



General R.K. Gaur



General R.K. Gaur

The army is playing an increasingly large role in affording protection to the black-necked cranes **(above)**, but senior officers should issue the strictest instructions to their staff not to directly approach the nests, as traumatised cranes may well desert the nest or cease to nest in the area in following years. Two black-necked cranes photographed in mid-flight **(top)**, against a backdrop of Ladakh's forbidding mountains. Of all the 15 species of cranes, the black-necked crane **(facing page)** is perhaps the only one that has eluded man's scrutiny to retain its age-old aura of mystery and charm.

So captive breeding seemed to be the only solution for the rehabilitation of the black-necked crane. A conclusion was reached that urgent efforts were required to collect at least ten eggs, during the current season, which would be sent to the International Crane Foundation in Baraboo, Wisconsin, for artificial incubation and hatching. It was also mentioned that India should later set up her own captive breeding centre.

Serious doubts, however, about the feasibility of obtaining eggs from Ladakh and the haste with which the programme was being pushed through by the ICF and the J & K Wildlife Department, without even the prior consent of the Government of India, were raised by the Bombay Natural History Society. This argument is no doubt valid insofar as the black-necked crane is an endangered bird in Ladakh but, it has been brought to the attention of the ICF that a fairly large number of black-necked cranes *do* exist in China-Tibet. This means that the black-necked crane, as a species is not so precipitously poised on the brink of extinction as to justify a collection of its eggs. On the other hand, however, since there are only three or four pairs of the cranes within Indian boundaries, we should ensure that these nesting pairs are well-protected, nesting bogs identified and the eco-system of the areas left unaltered. It was as a result of these objections, raised by Dr. Salim Ali both in his capacity as President of the BNHS and Chairman of the expert committee on birds of the Indian Board for Wildlife, that a joint BNHS/WWF expedition was proposed (1983) to determine the exact number of breeding black-necked cranes in Ladakh, their breeding success, biology and behaviour, as also the feasibility of gathering eggs for the purpose of captive breeding. One of the aims of the expedition, undertaken by the Vice Admiral, M.P. Awati (Retd.), Mr. Prakash Gole, a WWF representative, and myself (BNHS), was to examine the feasibility and possibility of establishing the artificial incubation centre for captive breeding, in India, *preferably in Ladakh* . The many problems, like a lack of proper transportation facilities and equipment, as well as the impracticality of collecting crane eggs from several nests simultaneously within a particular incubation period, seems to make such a programme ill-advised. Instead, I feel it is far more sensible to study the status of the nesting cranes in their natural habitat of Ladakh, in order to encourage those ecological factors that would benefit the birds in their natural environment.

The Hanlé monastery, considered to be the second-most sacred in the Tibetan plateau, perched atop a steep hillock, overlooks a vast marsh on the banks of the Hanle stream in the south-west corner of the Ladakh plateau. When we reached it on June 16, 1983, I noticed that the marsh seemed to have shrunk since my last visit in 1976 and that a number of houses were scattered over the dry areas. It appeared to me to have been drained artificially in order to reclaim land for cultivation and housing. On our previous expedition we had located a crane pair with their chick in the marsh and I had had the good fortune of having obtained the first-ever colour photograph of the black-necked crane in the wild in Ladakh. This time, however, the cranes seemed to have abandoned the marsh and moved to a small bog, about 16 km. away, close to the sand track leading to Hanlé. A small hillock, appropriately named 'Purple Mountain' provided us with a landmark for locating the nesting marsh. The nest, plainly visible from the sand track, contained two earthy-brown eggs and was perched on a raised mound in a shallow pond, about six inches deep, encircling a bog. At first, the nest looked most unsafe. Situated barely 100 metres from the main track, one could walk right up to the edge of the pond from where the nest was only 30 metres away. However, I need not have worried, for later in the day, when I did try to wade up to it to measure the eggs, I sank up to my waist with my very first step and reached the nest with great difficulty—wet and frozen. Prakash pitched a small tent near the pond while I sat in the open a little way off. Throughout all this activity, the crane pair stood on the opposite shore of the pond, which was about 100 metres across, preening themselves. This behaviour, I had already noticed, was some sort of nervous displacement activity. So we sat motionless, waiting for them to settle down.

For a long time the cranes continued their ritual preening, while a pair of very garrulous Brahminy ducks arrived and proceeded to wade around, honking incessantly. I later discovered that they had a brood of

about seven to eight chicks of varying sizes, tucked away among the boggy mounds and their constant honking was to warn their chicks of our presence.

The duck family had obviously moved in recently from their nesting cliff nearby and the cranes, for some reason, did not like the intruders. The male deliberately chased them away with his wings raised as if to attack, and once when the two ducks got too close to the cranes' nest, the male darted across and, flapping his wings, chased the pair right out of the pond. We had been there for over 45 minutes and neither of the two cranes had attempted to approach their nest to incubate the eggs. Generally both male and female cranes share their responsibilities, sometimes changing roles as often as ten times a day. The eggs, which normally number two, measure 100 × 60 mm., weigh about 200-210 gm., and are usually a dull-white or brown. They are laid in nests in shallow water up to about 24 inches deep, and take roughly 28-36 days to hatch. Seventy per cent of the eggs hatch successfully into beautiful tawny-brown or grey chicks that, surprisingly, can swim and walk even when they are only a few hours old. In one to two days the chicks are quite mature and although their parents are very attentive, one precocious chick often pecks the other so severely that it is forced away, probably to die without the protection of its parents. Crane families remain intact for roughly nine months or more and it is only when the next breeding season is about to commence that the parents chase their young away. These youngsters join up with others of their age, forming flocks of their own that remain together for the rest of the breeding season. They themselves may start to breed when they are between three to five years old and some rarely, even at the age of two.

I was rather apprehensive about the eggs getting cold. Judging from her behaviour, it appeared as if it was the female's maiden nesting venture, and she seemed extremely nervous about an alien presence. Eventually, the male 'force-walked' her towards the nest and stood close by until she sat on the nest. He remained about ten metres from the incubating female, thereafter directing his aggression towards the pesky duck pair, which, equally apprehensive about *their* chicks, had come back to resume



their honking. By now we, of course, had been completely accepted by the cranes and the male resumed his diligent feeding while the female appeared to doze off. But the peaceful atmosphere did not last long. Attracted by the presence of Prakash's tent, a pair of ominously large ravens had arrived on the scene unnoticed by the feeding male. Seated in the open, a few metres from the tent, I was able to clearly witness the drama that was about to unfold around me. The ravens, used to feeding on titbits around shepherds' tents, hopped around looking hopefully for food. It was their grating calls that roused the incubating female from her slumber. Alarmed at seeing them, she was up in a flash and, carefully stepping off the nest, she picked up some dead weeds from around the nest and started thrashing them about.

I did not see or hear a signal, vocal or visual, pass between the pair but the male soon came dashing aggressively out towards the ravens which were now moving between the tent and myself. Charging in, water splashing, wings flapping menacingly, and completely ignoring my presence he repeatedly shooed off the ravens who superciliously hopped away, just out of his reach. All this time, I was frantically struggling to focus my camera on the action taking place almost at arm's length. Eventually, tired of the game, the ravens flew off to a nearby cliff and the crane returned to his post near the nest. The female anxiously waited some 30 metres away.

But the ravens had not yet accomplished their mission. They returned after a while and this time one of them dived at the exposed eggs. The male crane frantically defended his eggs while the ravens cleverly changed tactics every now and then flying towards the nest, one at a time, to distract the defending male. At this juncture, fearing the worst, I rushed to the cranes' rescue and chased away the attackers. The tent was at once dismantled and we cleared off from the area allowing the cranes to settle down once again. The following morning I was glad to see one of the cranes peacefully incubating, and after warning the local shepherds and requesting the nearby army post to take care of them, we continued on our journey. Later, we were pleased to hear that the officer in charge of the outpost had stationed a patrol party to guard the nesting bog and much later we received the happy news that the eggs had successfully hatched.

Our next camp was near Tsokar where a crane pair had been observed engaging in a courtship display. But unfortunately, a deterioration in the weather and the subsequent heavy snowfall, forced us to abandon camp and return to the nearest army post where we were informed that the Chushul eggs were missing. We rushed back to Chushul, hoping against hope that the eggs had hatched and the parent birds had led the chicks away from the marsh. Though we combed the entire area for two days in search of the cranes, we were disappointed. The original nesting bog had dried up considerably and we saw that the nest site was very easily approachable. We carefully examined the area for signs of broken egg-shells or any indication of predation, but except for deep hoof marks of ponies around the nest (could it have been a rider?) there were no signs of any animal, around the nest. Later, returning to camp I could not help feeling that the eggs might have been stolen.

The marshes in Ladakh have long been the



General R.K. Gaur

Incubation takes all of 28 to 36 days with roughly 70 per cent of the eggs hatching successfully.



General R.K. Gaur

Both male and female cranes share the incubation of their eggs, changing duty between two to ten times each day. Here the parent can be seen turning the eggs over to ensure their even heating.

traditional breeding areas of at least three pairs of black-necked cranes. The cranes arrive in the area in early-May, passing through the Indus valley as the river Indus enters Indian territory, and move along its banks to finally arrive at these marshes. They rest here till about the end of October before moving back to their winter quarters.

The evidence gathered so far from our trip suggests that the population of the black-necked crane has been constant for the past 40 years with one pair nesting in Chushul, one in Hanlé and another in Tsokar with an odd singleton visiting the area. We could now conclude also that Ladakh is a peripheral breeding ground for the black-necked crane and a larger, more suitable area exists in the Tibetan plateau. Recent information available from China indicates that such cranes do visit Chinghai (to breed), Szechwan (also to breed), Quizon (to winter) and in the Quighai province, breeding takes place in large numbers.

It is now obvious that, outside Ladakh, the black-necked crane is not quite as rare as it is made out to be. Lack of information, inaccessability of certain areas and the exclusive movement patterns of the birds have led to this belief and it is encouraging to note that more information regarding their status *is* being made available and that Chinese ornithologists are making serious efforts not only to study the cranes in the wild but also to safeguard their nesting/wintering areas. It is now also learnt that a study-cum-breeding centre has been established in the Chinghai province in China.

In an overall atmosphere of gloom in the corridors of conservation, it is my considered opinion, that the black-necked crane provides us with a glimmer of hope in spite of its endangered status. Those involved with conservation projects would do well not to cry 'wolf' and to desist from exaggerating the deteriorating status of those species which may be few in number but whose existence is clearly not threatened with *extinction*. Our efforts tend to get dissipated this way, and those not directly concerned with conservation actions tend to look upon us as alarmists or wide-eyed fanatics. This is not to say that one advocates a cavalier attitude towards the protection of birds as rare and elusive as the black-necked crane, but merely, that our actions and utterances be tempered with reason and rationality. □



M.Y. Ghorpade

Jasrota

—Jammu's forest of peace

by Mir Inayat Ullah

Our jeep bumped along a *kutcha* road some 3.5 km. past Rajbagh, a village situated on the Jammu-Pathankot highway. Our destination was the right bank of the river Ujh, 70 km. north-west of Jammu. Here lay the historic Jasrota fort, now in ruins, and around it some of the finest forests of the region. I was surveying an area which had only recently been earmarked for protection as the Jasrota Wildlife Sanctuary.

A herd of chital *(Axis axis)* broke cover from my right and hurtled across the road in front of our jeep. As I sat back, basking in the pleasure of this commonplace sighting, I thought to myself how very vital it was that such pockets of green receive protection from the plough, the scythe and the machines of our age. The area was once a humming, buzzing centre of activity, as the capital of the Jasrota Jagir. The late Maharaja of Jammu and Kashmir, recognising its potential declared it as a Game Reserve under the provisions of the old Game Act of 1942. When India attained its independence the management of the Park was transferred to the forest department which allowed concessions for the extraction of bamboo and firewood and also permitted villagers to graze livestock within the forest confines. It was only in 1984 that the responsibility of managing the 1,004-acre forest was handed over to the Jammu and Kashmir Department of Wildlife Protection. As can be imagined, we have our work cut out for us. Restoring the habitat to its old prime condition will not be easy, and social pressures from the surrounding areas are going to add to our burden. But these are the challenges our department thrives on.

As if to shake me from my thoughts, a flurry of feathers erupted from the shrubs with a shrill, raucous call. It was a red jungle fowl *(Gallus gallus),* the precursor to all our domestic breeds. The large, handsome bird shared its home with the even grander peacock *(Pavo cristatus)* and the jungle bush quail *(Perdicula asiatica)*. The abundance of ground birds is totally dependent on the protection one is able to afford to their chosen habitat, particularly soon after nesting takes place. Our direction was clear, we would concentrate on habitat protection as this would also automatically help the countless other vertebrate and invertebrate life forms that constitute any biotic environment.

For the Jasrota Wildlife Sanctuary we hope to implement management plans in a comprehensive, pragmatic fashion. We shall bring to the fore all the experience gleaned from the protection of the several other parks and sanctuaries in the state. We hope to avoid repeating past errors and to prevent the waste of scarce resources. To begin with, we intend to treat the people who live in the surrounding villages not as problems but as solutions integral to our plans. To the north of the sanctuary lie Guram surja, Mala taloti, Tibba, Furlein, Mun and Guram wala. To the south are Jasrota, Mala, Shani and Kuhampur. The areas belonging to these people will become the focus of our department's efforts to introduce wise land-use concepts. Controlled grazing, seasonal plantation of crops, biogas usage, seasonal grass-cutting and limited firewood collection (supervised by the department) are some of the methods by which we hope to improve the lives of the villagers. Such social uplift is bound to reduce the pressure on the limited resources of the sanctuary, and in the process both man and animal will benefit.









M.Y. Ghorpade

Our immediate problem, of course, is manpower. Currently, the area receives no more than the supervision of one forester and three guards—a hopelessly inadequate force. Work is afoot to augment this force and we are confident that time and protection will eventually work in our favour. The usual problems that beset forests are at work here as well. Poachers have thus far had a field day. Our mere presence will deter most of them but we hope to prosecute habitual offenders in order to set a deterrent example for others. Indiscriminate grazing will be controlled to a large extent by fencing vulnerable areas. Grass-cutting will be done in a phased manner so as to augment the villagers' incomes and also to delineate fire lines, thus reducing the fire hazard to the area.

The Jasrota Sanctuary, in fact, is typical of the habitats to be found in the North Indian plains. *Acacia catechu* and *Acacia arabica,* typical dry zone plants can be found in association with shrubs such as *Lantana camara, Carisa spinarum* and climbers such as *Bauhinia vahlii.* The entire area is divided by the Daloti ridge. On one side of the ridge the flora and fauna have struck a good balance, and adequate wood cover is available to the denizens of the area. On the other side, however, where rich bamboo stands once reigned supreme, man's unwise attention has taken its toll. Degradation is obvious even to the untrained eye and here some amelioratory steps are definitely required. Native wild fruit and fodder plants will be reintroduced in a large way. Soil conservation steps such as the construction of check dams, and gully plugging will have to be undertaken. The ex-Maharaja had created some water points which have now silted up. These will be cleared and renovated and will eventually benefit the animals as well as the people of the

---

The nilgai **(overleaf)** is a stocky, somewhat ungainly animal, iron grey in colour with patches of white on its fetlocks, cheeks and chin. This fast-moving blue bull, as it is also called, is considered a near relative of the cow, and therefore sacred. The common langur **(left)** or Hanuman monkey moves with incredible speed and grace as it utilises its long limbs and tail to its utmost advantage.







Kailash Sankhala

A jungle cat *(Felis chaus)*. Little over two feet with a tail about a foot long this long-legged, agile cat is a distinctive creature, has cold-looking pale, green eyes, and yellowish grey fur. It moves about during the day, much like a miniature version of a panther, preying on small mammals and birds. This cat is exceedingly strong for its size and very bold, being able to bring down prey much larger than itself.

region who have thus far been denied a perennial water supply. The ground cover, of course, will help to further bind the soil and will eventually help to control the siltation taking place at the Ujh Barrage, which is today a heavy financial drain on the state.

To orient visitors to the sanctuary we shall be setting up a Nature Interpretation Centre, which will house specimens, to familiarise tourists with the types of life forms found in the forest. The Centre will possess an updated library, checklists of birds and animals present, visual aids and soon, a pre-recorded audio-visual programme on the natural heritage of Jammu and Kashmir.

As I mentioned earlier, we do not expect our task to be an easy one, but the rewards of such endeavours – the sight of healing forests – compensates for all kinds of hardships. □

Sanjay Gupta

Quite common and extremely attractive the spotted fawn-coloured chital sports a graceful set of antlers, that usually possesses three tines. Frequent association between this deer and the monkeys of the forests have been noted, presumably for feeding and predator-detection purposes.

The grey ghost

by Bittu Sahgal



Dr. Fox

Displaying characteristics of both sheep and goats, bharals **(facing page)** live in groups, at altitudes of over 4,500 metres. These ungulates graze on the grass slopes well above the tree line, scaling inaccessible, precipitous cliffs effortlessly. Bharals are encountered practically throughout the Himalayas. Wild sheep and goat populations have been reduced by hunting for human consumption, and domestic livestock has displaced wild ungulates from their grazing areas. This trend, if it continues, will have serious consequences on the snow leopard population, in the wild. The snow leopard **(above)**, commonly referred to as 'the grey ghost of the Himalayas', is an elusive predator. The status and distribution of this great cat is not very clear, both on account of its wary behaviour and the inaccessibility of its habitat.



R. Singh



R. Singh

Marmots are common rodents found above the tree line in the Himalayas, where their shrill, ringing calls are often heard. A favourite food item of predators such as the snow leopard, lynx and also of large birds of prey like the golden eagle, marmots are wary animals, dashing into their burrows at the slightest sign of danger.

Trekking above the tree line in the Himalayas is an experience easier felt than communicated. There is a crisp newness in the air. Despite bone-chilling cold and fatigue, the mind somehow feels scrubbed clean, and with every step one celebrates the simple fact of being alive. Raptors, choughs and a host of other birds and insects serve as constant companions. The whistle of marmots and the buzz of bees are reminders of the throb of life which exists despite the visual bleakness of the surrounds.

In all the time I have spent trekking and photographing these awe-inspiring ranges, however, I have never come across even the faintest hint of the presence of the snow leopard—an animal often referred to as 'the grey ghost of the Himalayas'. Till very recently, virtually no one else had either, save for a scattered few who wistfully recounted sightings from days gone by.

All this has now changed. Thanks to the enlightened protection of the J & K Wildlife Department and the pioneering efforts of Dr. Joseph Fox who heads the Indo-US Snow Leopard Project, a stream of information has started pouring in about the natural history of this elusive predator. Additionally, from March 7-9, 1986, he and his team, comprising S. P. Sinha, R. S. Chundawat and P. K. Das, spent over 20 daylight hours photographing and observing an adult female snow leopard in the Markha valley in Ladakh. Spurred on by their success, they subsequently shifted their base, in July, to Uttar Pradesh and Himachal Pradesh where still more valuable data is being collected.

The fragility of mountain eco-systems is difficult to comprehend. Humans can, at best, hazard intelligent guesses as to the checks and balances which come into play in maintaining a healthy mountain environment. Our sophisticated equipment is wholly inadequate in assessing whether or not a habitat is thriving. In fact, the only reliable method of evaluation is to establish and monitor the presence of wild plant and animal life. This simple truth, more than any other, lends urgency and gravity to the efforts being made by Dr. Fox's team


R. Singh

Found in the snow-bound, rocky terrain above the tree line, the swift-footed Tibetan woolly hare is a principal prey species of high-mountain predators such as the lynx and the snow leopard.

and others like them who devote valuable energy and resources to studying wild habitats. By confirming the presence of apex predators, and the availability of their prey, they are literally diagnosing the health of our environment.

Recognising the immediate threat to the survival of the snow leopard in the wild, the Government of India and the United States Fish and Wildlife Services have agreed to a co-operative effort to develop a conservation programme for the snow leopard in northern India. The Wildlife Institute of India, created in part to support research on threatened wildlife species of the sub-continent, the University of Washington, the Woodland Park Zoological Gardens and the International Snow Leopard Trust are other institutions participating in the Project.

Acting on a vote at the Fourth International Snow Leopard Symposium, the Government of India was asked to host the Fifth International Snow Leopard Symposium. It would now be possible for representatives, in areas where the snow leopard occurs in the wild, to confer with experts from countries which have experience with captive breeding and other such programmes.

The Fifth International Snow Leopard Symposium, which will take place from October 13-15, 1986, in Srinagar, will be attended by representatives from over 21 countries. Its basic purpose is to promote measures and exchange information which will help to ensure the perpetuation of *viable breeding populations* of the species.

Besides the free flow of information about the status of the snow leopard in the wild, there are a number of related objectives that the Symposium seeks to meet: To provide a means for discussion on the management of the snow leopard in captivity; to inform and educate persons on the endangered status of the snow leopard and the importance of its relationship with other mountain species; to promote continued cultural and ecological research on alpine eco-systems; to develop an outline for a universally compatible information system,



R. Singh

The Govind Pashu Vihar Sanctuary, as seen from a little beyond Sankeri, in the Upper Tons Valley in the Garhwal Himalayas (Uttar Pradesh). Among the many animals found here are the serow, common leopard, goral, musk deer, bharal and snow leopard.

including a comprehensive annotated bibliography; to identify key education programmes and methods of disbursement and to identify the possibility of release programmes. An important part of the Symposium will be a discussion on the status and distribution of the snow leopard with regard to associated prey species in the animal's natural habitat. And to identify a suitable site for carrying out an in-depth study on the ecology of the snow leopard. Only after such research has been undertaken, can vital habitats for the snow leopard be protected and management plans developed. The paucity of data on this animal can be attributed to the cat's elusiveness and the harsh climate and rugged terrain in which it lives.

The snow leopard inhabits the high mountains of Central Asia, and within India, is found along the northern border, in Arunachal Pradesh, Sikkim, Uttar Pradesh, Himachal Pradesh and Jammu and Kashmir. The Ladakh district of Jammu and Kashmir includes a large area of potential habitat and reports indicate that a relatively undisturbed snow leopard population may exist in a few sites. Since the Ladakh area is known to support snow leopard populations, and some of the habitat is fairly accessible, this may prove to be a feasible study site for ecological investigation. The snow leopard is considered endangered in every region in which it is found. Three factors contribute towards a decline in its population. Firstly, the animal is hunted by the locals for its valuable pelt and also to protect livestock. Secondly, ungulate prey of the snow leopard, wild sheep and goats, have been reduced by hunting for human consumption and thirdly, domestic livestock has displaced wild ungulates from their grazing areas. If this trend continues, it is doubtful whether the snow leopard will survive, except in a few isolated areas or in captivity.

India has received world-wide acclaim for its role in protecting endangered species, particularly through Project Tiger. We have now taken the lead in rescuing an equally vital and charismatic predator, the snow leopard. □

SAVE WILDLIFE



Ashok Nath

Department of Wildlife Protection, J&K Govt.

DEPARTMENT OF WILDLIFE PROTECTION J&K GOVT.